ORAL ARGUMENT NOT YET SCHEDULED

No. 14-1046 (and consolidated case)

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

CARBON SEQUESTRATION COUNCIL, *et al.*,

Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *et al.*,

Respondents.

ON PETITION FOR REVIEW OF FINAL REGULATIONS PROMULGATED BY THE ENVIRONMENTAL PROTECTION AGENCY

OPENING BRIEF OF PETITIONERS CARBON SEQUESTRATION COUNCIL, SOUTHERN COMPANY SERVICES, INC., AND AMERICAN PETROLEUM INSTITUTE

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August 28, 2014
(Initial Brief)

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CERTIFICATE AS TO PARTIES, RULINGS AND RELATED CASES

(A) PARTIES AND *AMICI*.

The following is a list of all parties, intervenors, and *amici* in this Court:

Parties:

Carbon Sequestration Council, petitioner;

Southern Company Services, Inc., petitioner;

American Petroleum Institute, petitioner;

United States Environmental Protection Agency, respondent; and

Gina McCarthy, Administrator, United States Environmental Protection Agency, respondent.

Intervenors:

None.

Amici:

None.

CIRCUIT RULE 26.1 DISCLOSURE STATEMENT

Carbon Sequestration Council: CSC represents companies primarily involved in the exploration and production of oil and natural gas or in the production and distribution of electricity. Petitioner CSC is an unincorporated membership trade association that operates as a continuing association of numerous corporations operated for the purpose of promoting the general interests of the membership in the regulation of the capture, transportation, utilization and geologic storage of carbon dioxide as a greenhouse gas mitigation methodology. CSC is a "trade association" within the meaning of Circuit Rule 26.1.

Southern Company Services, Inc.: Petitioner SCS is the services company for Southern Company, a registered public utility holding company, organized under the laws of the State of Delaware and having its principal place of business in Atlanta, Georgia. The Southern Company owns all of the outstanding shares of common stock of SCS and of five (5) electricity utility subsidiaries: Alabama Power Company, Georgia Power Company, Gulf Power Company, Mississippi Power Company, and Southern Power Company (collectively the "Southern

Operating Companies"). Four of the Southern Operating Companies (Alabama Power Company, Georgia Power Company, Gulf Power Company, and Mississippi Power Company) are engaged in the manufacture, generation, transmission, and sale of electricity and serve both retail and wholesale customers within specified franchised electric service territories in portions of Alabama, Georgia, Florida and Mississippi, respectively. Southern Power Company is engaged in the manufacture, generation and sale of electricity and serves only wholesale customers. SCS acts as the operating agent for the Operating Companies with respect to the execution and administration of certain contracts and in proceedings before, *inter alia*, the Environmental Protection Agency ("EPA"). SCS also provides administrative services including regulatory affairs, compliance and operating services in connection with integrated operations. This includes responsibilities to oversee and coordinate the installation and operation of environmental systems, such as carbon capture systems, which are the subject of the EPA regulations at issue.

American Petroleum Institute: API represents over 600 members involved in all aspects of the oil and natural gas industry, leaders of a technology-driven industry that supplies most of America's energy, supports more than 9.8 million jobs and 8 percent of the U.S. economy, and, since 2000, has invested nearly 2 trillion dollars in U.S. capital projects to advance all forms of energy, including

alternatives. API is a continuing association for the purpose of promoting the general commercial, regulatory, legislative, or other interests of the membership. API is a "trade association" within the meaning of Circuit Rule 26.1. API has no parent companies, and no publicly held company has a 10 percent or greater ownership interest in API.

(B) RULINGS UNDER REVIEW.

These consolidated cases seek judicial review of a final regulation entitled "Hazardous Waste Management System: Conditional Exclusion for Carbon Dioxide (CO_2) Streams in Geologic Sequestration Activities," which the Administrator of EPA promulgated under the Resource Conservation and Recovery Act. 79 Fed. Reg. 350 (Jan. 3, 2014) (to be codified at 40 C.F.R. §§ 9.1, 260.10, 261.4(h)). The Agency's Docket Identification Number was EPA–HQ–RCRA–2010–0695.

(C) RELATED CASES.

These cases were not previously before this Court or any other court. The undersigned counsel are not aware of any related case currently pending in this Court or any other court.

DATED: August 28, 2014

Respectfully submitted,

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TABLE OF CONTENTS

TABLE OF AUTHORITIES

Cases

*** Authorities upon which we chiefly rely are marked with asterisks.**

Statutes

Legislative History

Session Laws

Bills

Reports

Administrative Decisions

Regulations

Federal Register

GLOSSARY

As used herein,

API means petitioner American Petroleum Institute;

CCS means carbon capture and storage;

CO_2 means carbon dioxide;

CSC means petitioner Carbon Sequestration Council;

EOR means enhanced oil recovery;

EPA means respondent Environmental Protection Agency;

GS means geological sequestration;

JA means the Joint Appendix;

RCRA means the Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901-6992k (2012);

SCS means petitioner Southern Company Services, Inc.; and

UIC means underground injection control, as in the underground injection control or "UIC" regulations under the Safe Drinking Water Act, 42 U.S.C. §§ 300f – 300j-26 (2012).

JURISDICTIONAL STATEMENT

Petitioners Carbon Sequestration Council ("CSC"), Southern Company Services Inc. ("SCS"), as agent for the Southern Operating Companies, and American Petroleum Institute ("API") (collectively, "Petitioners") seek judicial review of the action of the respondent Environmental Protection Agency ("EPA") in promulgating a final regulation under the Resource Conservation and Recovery Act ("RCRA"), 42 U.S.C. §§ 6901-6992k (2012). EPA promulgated the regulation on January 3, 2014 at 79 Fed. Reg. 350.

CSC and SCS timely filed their petition for review (No. 14-1046) on April 2, 2014. API timely filed its petition for review (No. 14-1048) on April 3, 2014. The Court has jurisdiction over both petitions under 42 U.S.C. § 6976(a) (2012).

STATEMENT OF THE ISSUES

Whether EPA's assertion of RCRA authority over carbon dioxide streams is in excess of statutory jurisdiction, authority or limitations; short of statutory right; arbitrary or capricious; or otherwise not in accordance with law.

STATUTES AND REGULATIONS

Pertinent statutes and regulations are in Addendum 1.

STATEMENT OF THE CASE

This case concerns the Nation's efforts to control the emission of greenhouse gases, in particular, carbon dioxide. At issue is whether carbon dioxide emissions

must be considered "solid waste" under RCRA when captured, transported by pipeline, and sequestered or stored in deep geologic formations, as EPA concluded in the final rule under review. The Petitioners assert that such carbon dioxide cannot be considered "solid waste," or, in the alternative, that EPA has the discretion to determine that such carbon dioxide is not "solid waste."

Carbon Capture And Sequestration

The combustion of fossil fuels at power plants and other industrial facilities produces carbon dioxide gas, which – if not "captured" – could be discharged into the atmosphere. *See* 76 Fed. Reg. 48073, 48076 (2011) [JA __, __]. One strategy that has been suggested for reducing carbon dioxide emissions is "carbon capture and storage" or "CCS." Carbon capture and storage involves capturing the carbon dioxide gas and compressing it into a supercritical fluid,[1] transporting the supercritical fluid through a pipeline, and injecting it underground for purposes of

[1] Under normal atmospheric temperature and pressure, carbon dioxide is a gas. A substance is described as a "supercritical fluid" when the substance is at or above its critical temperature and critical pressure. 79 Fed. Reg. 355 [JA __]. A supercritical fluid "has properties intermediate between a liquid and a gas." *Id.*; 76 Fed. Reg. 48075, 48078 [JA __, __]. A supercritical fluid is also known as a "dense-phase gas." Comments of Carbon Sequestration Council, Attachment A: Marston and Moore, *From EOR to CCS: The Evolving Legal And Regulatory Framework For Carbon Capture And Storage*, 29 Energy L. J. 421, at 426-427 ("CSC Comments"), Docket No. EPA-HQ-RCRA-0695-0084 [JA __-__]. Carbon dioxide can easily exist in a solid state, of course: it is commonly known as "dry ice" and is useful for transporting frozen items. At atmospheric temperature and pressure, however, the dry ice changes state directly into gaseous CO_2 (skipping the liquid phase), releasing an ephemeral white cloud employed for concerts, magic shows and multiple other entertainment purposes.

long-term storage or "sequestration." 76 Fed. Reg. 48075-76 [JA __-__]. EPA refers to the injection and storage step as "Geologic Sequestration" or "GS." *Id.* at 48075 [JA __].

Carbon capture and storage is currently being undertaken on a small scale. 75 Fed. Reg. 77230, 77234 (2010) [JA __, __]. However, EPA anticipates that CCS will ultimately play a significant role in climate change mitigation. *Id.* One EPA analysis projects that CCS could account for 10 percent of carbon dioxide emission reductions in the year 2050. *Id.*

The Use Of Carbon Dioxide In Enhanced Oil Recovery

Carbon dioxide plays an important role in enhancing the recovery of oil and natural gas from existing reservoirs. Carbon dioxide injected through injection wells into oil-producing reservoirs can increase production efficiency by increasing the mobility of oil in the reservoir. Report of the Interagency Task Force On Carbon Capture and Storage 39 [2010], Docket No. EPA-HQ-RCRA-2010-0695-0016. [JA __]. This process is one of several processes commonly referred to as enhanced oil recovery ("EOR"). 75 Fed. Reg. 77244 [JA __].

Carbon dioxide has been used for enhanced oil recovery since the 1970s. Report of the Interagency Task Force at 38 [JA __]. According to EPA, there were 105 such projects in the United States as of 2008, and those projects

recovered 323,000 barrels of oil per day that year, which amounted to 6.5 percent of total domestic production. 75 Fed. Reg. 77244 [JA __].

The majority of the carbon dioxide used in enhanced oil recovery at present (79 percent) comes from natural sources, *i.e.*, geologic domes in Colorado, New Mexico, and Mississippi. *Id.* The rest comes from manmade sources, including natural gas processing, ammonia and fertilizer production, coal gasification, and other industrial operations. *See id.*

During enhanced oil recovery operations, a significant portion of the injected carbon dioxide returns to the surface within the produced oil, returning to its gaseous state as it rises to the surface. Because the cost of the carbon dioxide constitutes a large portion of the cost of an enhanced oil recovery project, this carbon dioxide gas is separated from the petroleum and is recycled by again compressing the gas into its dense phase and reinjecting it into an oil reservoir. *See id.* Also, at the conclusion of the project, the carbon dioxide remains permanently underground or is collected and reused at other projects. *Id.* *See also* US Department of Energy National Energy Technology Laboratory, *Carbon Dioxide Enhanced Oil Recovery Untapped Domestic Energy Supply and Long Term Carbon Storage Solution*, at 17 ("all of the injected CO2 is retained within the subsurface formation after a project has ended or recycled to subsequent projects") [JA __].

Future Trends In Enhanced Oil Recovery With Carbon Dioxide

EPA believes that the future commercial availability of carbon capture and storage may "fundamentally alter" enhanced oil recovery with carbon dioxide in the United States. 75 Fed. Reg. 77244 [JA __]. EPA has explained that

> DOE anticipates that many early GS projects will be sited in depleted or active oil and gas reservoirs because the reservoirs have been previously characterized for hydrocarbon recovery and may have suitable infrastructure (*e.g.*, wells, pipelines, etc.) in place. Additionally, oil and gas fields now considered to be "depleted" may resume operation because of increased availability and decreased cost of anthropogenic CO_2.

Id. Also, "EPA anticipates opportunities to utilize CO_2-EOR operations for geologic storage will continue to increase." 79 Fed. Reg. 1430, 1474 (2014).

Regulation Of Underground Injection Under The Safe Drinking Water Act ("SDWA")

The underground injection of carbon dioxide for geologic sequestration and the underground injection of carbon dioxide for enhanced oil recovery are already heavily regulated under the Safe Drinking Water Act, 42 U.S.C. §§ 300f – 300j-26 (2012). EPA's underground injection control or "UIC" regulations under that Act are set forth in 40 C.F.R. Parts 144–148 (2013).

Regulations creating Class VI well permits under the underground injection control were promulgated in 2010. The Class VI regulations provide for the permitting of wells used to inject carbon dioxide for purposes of geologic

sequestration and are codified at 40 C.F.R. Parts 144–146 (2013). 75 Fed. Reg. 77230 (2010) [JA __].

Another UIC injection category is known as "Class II", originally adopted in 1980. 45 Fed. Reg. 42500 (1980). Class II permits are required for the injection of carbon dioxide in enhanced oil recovery operations (among other things). 40 C.F.R. § 146.5(b)(2) (2013).

At present there are no Class VI permitted wells (although the agency has issued draft permits for a handful of such wells). In contrast, a large number of Class II well permits have been issued for carbon dioxide injections for enhanced oil recovery operations. CSC Comments, Attachment A, at 424 n. 6 (over 9,000 permitted Class II carbon dioxide wells reported in Texas alone as of mid-2008) [JA __]. EPA stated that its conditional exclusion from RCRA for Class VI was "not intended" to affect the regulatory status of carbon dioxide injected into other well classes. 79 Fed. Reg. 355 [JA __].

Both Class II and Class VI wells are subject to EPA regulation governing well construction, operating, monitoring, reporting, and plugging after injection has ended. *See* 40 C.F.R. Part 146, Subpart C (2013) (Class II regulations) and 40 C.F.R. Part 146, Subpart H (2013) (Class VI regulations).

Regulation Of "Solid Waste" Under The Resource Conservation And Recovery Act

RCRA establishes a comprehensive "cradle to grave" federal regulatory program governing the treatment, storage, and disposal of "hazardous waste." *See United Technologies Corp. v. EPA*, 821 F.2d 714, 716 (D.C. Cir. 1987). "Hazardous waste" is defined as a subset of "solid waste." 42 U.S.C. § 6903(5) (2012). RCRA also establishes significant liabilities for any past or present handling of "solid waste" (whether hazardous or not), where such handling "may present an imminent and substantial endangerment to health or the environment." 42 U.S.C. §§ 6972(a)(1)(B), 6973(a) (2012).

The threshold term "solid waste" is defined in RCRA as follows:

> The term "solid waste" means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility *and other discarded material, including solid, liquid, semisolid, or contained gaseous material* resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 1342 of Title 33, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923) [42 U.S.C. 2011 et seq.].

42 U.S.C. § 6903(27) (2012) (emphasis added).

There is a wealth of case law in this Circuit on the meaning of the phrase "other discarded material." In the seminal case of *American Mining Congress v. EPA*, 824 F.2d 1177, 1193 (D.C. Cir. 1987) ("*AMC I*"), the Court held that

"Congress clearly and unambiguously expressed its intent that 'solid waste' (and therefore EPA's [RCRA] regulatory authority) be limited to materials that are 'discarded' by virtue of being disposed of, abandoned, or thrown away." *See also Association of Battery Recyclers v. EPA*, 208 F.3d 1047, 1052-56 (D.C. Cir. 2000) (reconfirming the holding in *AMC I*).

However, this Court has not had occasion to interpret the portion of the definition of "solid waste" that follows the phrase "other discarded material," and enumerates several physical forms, *i.e.*, "solid, liquid, semisolid, or contained gaseous material." This case presents such an occasion.

EPA, however, has a longstanding interpretation of this statutory provision as it relates to gases. First, according to this interpretation, only "containerized" gases or gases that have been condensed to liquids[2] can be "solid wastes;" the statutory definition "excludes all other gases." 54 Fed. Reg. 50968, 50973 (1989) [JA __, __]. Second, "containerized gases" do not include gases "contained" in a broad sense, but only gases that are "containerized in the narrower sense of being in an individual container such that the gas is amenable to shipment." *In Re: BP*

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[2] A condensed gas remains *liquid* at normal atmospheric temperature and pressure. *See* 54 Fed. Reg. 50972-73 [JA __-__]. Liquids are enumerated in the definition of "solid waste." 42 U.S.C. § 6903(27) (2012). But EPA has made clear that "true gases," *i.e.*, gases "which remain gaseous at standard temperature and pressure," are among the gases excluded from the statutory definition. *See* 54 Fed. Reg. 50973 [JA __]; 49 Fed. Reg. 5314 (1984) [JA __]. A supercritical fluid returns to a gaseous state at normal atmospheric temperature and pressure.

Chemicals America Inc., Lima, Ohio, 3 E.A.D. 667, 670 (1991) [JA __, __]. Third, gaseous emissions from industrial processes in piping are "uncontainerized gas[es]," and hence, are not "solid wastes." *See id.*; 54 Fed. Reg. 50973 n.5 (1989) [JA __]; 47 Fed. Reg. 27520, 27530 (1982) [JA __, __].[3]

The Rulemaking At Issue Here

The Proposed Rule

In 2011, EPA proposed a conditional exclusion from the RCRA hazardous waste regulations for captured "carbon dioxide streams" that are injected into a Class VI injection well for purposes of geologic sequestration. 76 Fed. Reg. 48073, 48092-93 (2011) [JA __, __-__]. EPA explained its objective in these terms:

> In an effort to establish a regulatory framework that supports the future development and deployment of CCS technologies, EPA has set out a goal to provide the regulatory certainty needed to foster industry adoption of [carbon capture and storage].

Id. at 48077 [JA __].

The proposed rule defined "carbon dioxide streams" as:

> [C]arbon dioxide that has been captured from an emission source (e.g., power plant), plus incidental associated substances derived from the source materials and the capture process, and any substances added to the stream to enable or improve the injection process.

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[3] EPA reaffirmed its position as recently as 2011. Letter from S. Rudzinski (EPA) to T. Hunt (American Forest and Paper Association) (May 13, 2011) [JA __].

Id. at 48092 [JA __].

In the preamble to the proposed rule, EPA asserted that

> A supercritical CO_2 stream injected into a permitted UIC Class VI well for purposes of [geologic sequestration] is a RCRA solid waste, as it is a "discarded material" within the plain meaning of the term in RCRA § 1004(27).

Id. at 48077-78 [JA __-__]. At that time, EPA did not specifically address the issue of whether supercritical carbon dioxide is of a *physical form* covered by the definition of "solid waste."

Comments On The Proposed Rule

Many parties commenting on the proposed rule urged EPA either to make clear that carbon dioxide streams that are captured and injected are not subject to RCRA at all, or to promulgate an exclusion from the definition of "solid waste" – and not just a conditional exclusion from hazardous waste regulation, as EPA had proposed. Some commenters pointed out that supercritical fluids are not among the physical forms enumerated in the statutory definition of "solid waste," and argued, therefore, that supercritical carbon dioxide cannot be a "solid waste." Comments of American Petroleum Institute 5 ("API Comments"), Docket No. EPA-HQ-RCRA-0695-0077 [JA __]; Comments of American Electric Power 2, Docket No. EPA-HQ-RCRA-0695-0063 [JA __]. In a similar vein, the Carbon Sequestration Council commented that EPA had previously determined that captured air emissions (like carbon dioxide emissions) are not "solid wastes" and

"fall outside the jurisdiction of RCRA" because they are not "contained gaseous material." CSC Comments 2, Docket No. EPA-HQ-RCRA-2010-0695-0084 [JA __].

Commenters also offered several policy-based reasons for EPA to exclude carbon dioxide streams from the definition of "solid waste." For example, the American Petroleum Institute pointed to the need for regulatory certainty, and argued that classifying carbon dioxide streams as "solid waste" would not advance protection of health and the environment, given the rigorous requirements of the existing underground injection control regulations under the Safe Drinking Water Act. API Comments (Cover Letter at 2), Docket No. EPA-HQ-RCRA-0695-0077 [JA __].

Other commenters pointed out that the RCRA regulations are a poor fit for carbon dioxide streams. For example, Chevron U.S.A. Inc. argued that:

> The regulations that were developed under RCRA are alien to this technology, and we believe EPA's attempt to "fit" CCS into that existing regulatory paradigm is tantamount to trying to fit a square peg into a round hole. For example, the analytical methods that were developed to identify characteristic hazardous wastes are not suitable for analysis of gaseous materials, including gases that exist for some transient period of time in a supercritical state. Similarly, the RCRA management requirements contemplate tangible wastes that can be physically picked up, moved around, placed on the ground, treated in treatment systems, or disposed of in landfills. None of those attributes is directly applicable to the processing and injection of bulk CO2 streams.

Comments of Chevron 1-2, Docket No. EPA-HQ-RCRA-2010-0695-0064 [JA __-__].

Other commenters suggested that the existence of potential RCRA liabilities would serve to discourage future development and use of carbon capture and storage. *See* Comments of Utility Solid Waste Activity Group 3, Docket No. EPA-HQ-RCRA-2010-0695-0066 (expressing concerns over potential litigation) [JA __]. *See also* Comments of Basin Electric 4, Docket No. EPA-HQ-RCRA-2010-0695-0076 (stating that "[a]ny potential RCRA liability will be a deterrent to CO_2 storage projects") [JA __].

The Final Rule

EPA promulgated the final rule substantially as proposed. 79 Fed. Reg. 350 (2014) [JA __]. As to the status of carbon dioxide streams as "solid wastes," EPA said its hands were tied: "A solid waste regulatory exclusion would need to be based upon a finding that CO_2 streams sent to a UIC Class VI well for purposes of GS are not being discarded . . . EPA does not agree with such a conclusion." Response To Comments 27, Docket No. EPA-HQ-RCRA-2010-0695-0108 [JA __]. *See also id.* at 189 ("RCRA expressly applies to 'solid wastes,' which EPA has explained elsewhere includes CO_2 streams . . . The RCRA regulations apply by their terms.") [JA __].

EPA responded to commenters' complaint that its action was inconsistent with its prior interpretation as follows:

> [T]he CO_2 streams are delivered by pipeline and injected into UIC Class VI wells for GS in a supercritical state . . . . While EPA has indeed interpreted the meaning of specific terms listed, including "contained gaseous material," the RCRA definition of solid waste encompasses "other discarded material" and does not speak to materials such as supercritical fluids. Like the listed "solid, liquid, semisolid, or contained gaseous material" specifically referenced, CO_2 streams sequestered for purposes of GS are "other discarded material" from industrial and commercial operations and, therefore, are of a similar kind to the other types of wastes specifically referenced by the definition. They are, therefore, RCRA statutory solid wastes.

79 Fed. Reg. 355 [JA __]. EPA's Response to Comments dismissed the claim of inconsistency as "not on-point" (Response To Comments at 66-67 [JA __]), and repeated the above-quoted response, essentially verbatim. Response To Comments at 26, 35-36, 66-67, 110-11, 169, 184 [JA __, __-__, __-__, __-__, __, __].

The Scope Of Petitioners' Challenge

Petitioners here challenge EPA's underlying determination that carbon dioxide as a gas or as a supercritical fluid is a "solid waste" under RCRA, but do not contest the conditional exclusion from regulation as a "hazardous waste" or the terms under which a carbon dioxide stream would qualify for that exclusion. Hence, if Petitioners prevail on their *solid waste* claim, the conditional exclusion for carbon dioxide as *hazardous waste* would be meaningless because the exclusion only applies if the carbon dioxide in question would otherwise be subject

to RCRA regulation. If Petitioners do *not* prevail, however, then EPA's conditional exclusion of certain carbon dioxide from regulation as *hazardous waste* would remain in place.

SUMMARY OF ARGUMENT

To be subject to RCRA regulation, a material must be a "solid waste." The RCRA definition of "solid waste" is highly specific and enumerates certain physical forms: solid, liquid, semisolid, and contained gaseous material. The definition does not mention supercritical fluids (such as the carbon dioxide streams at issue in this case), which EPA acknowledges.

Applying traditional tools of statutory construction, it is clear that Congress intended to cover the enumerated forms of material, and no others. A review of the legislative history confirms that Congress deliberately specified the physical forms it intended RCRA to cover and provides no hint that Congress intended to authorize EPA to expand the list. Thus, EPA's assertion of RCRA authority over supercritical fluids – materials not enumerated in the definition of "solid waste" – conflicts with the clear intent of Congress.

In the alternative – assuming that the statute is ambiguous – EPA's interpretation is neither reasonable nor entitled to deference, for several reasons. First, EPA mistakenly assumed that its interpretation is the only plausible interpretation of the statute. Second, EPA did not thoroughly investigate its

position or bring to bear its expertise in resolving any ambiguity. Third, EPA's interpretation here directly conflicts with EPA's longstanding interpretation with respect to the status of uncontained gaseous materials – and this conflicting position is not justified in the record.

The unexplained inconsistency in EPA's interpretations also renders its interpretation here arbitrary and capricious. An agency is duty bound to follow, reasonably distinguish, or overrule its own precedents. Where an agency overrules its precedent, it must provide a reasoned justification for doing so. In this case, EPA has done none of those things.

EPA also acted arbitrarily in responding to public comments on the lack of a specified method for determining whether a given carbon dioxide stream may be hazardous. Commenters complained before and after EPA issued the proposed rule that existing RCRA tests and criteria could not be applied to carbon dioxide streams. EPA did not provide a reasoned response to those comments.

EPA's position on the "discard" criterion in the definition of "solid waste" is also seriously flawed. EPA insists that carbon dioxide captured from emissions sources and stored or "sequestered" in Class VI wells must be considered "discarded" (and hence, "solid waste"), *even where the carbon dioxide may later be withdrawn for productive use*.

EPA's position is not consistent with the ordinary meaning of the word "discarded," which – this Court has held time and again – is the meaning Congress intended. Moreover, even if the word "discarded" were ambiguous in the present context (which it is not), EPA has not reasonably explained why carbon dioxide that is stored or "saved" for future productive use should be considered "discarded."

In sum, EPA's assertion of RCRA regulatory authority over carbon dioxide streams (based on EPA's interpretation that such streams are "solid wastes") exceeds its statutory authority; is contrary to law; and is arbitrary and capricious. The Court should vacate EPA's assertion of authority over those materials.

STANDING

Petitioners have Article III and prudential standing. The standing of petitioner Southern Company Services, Inc. ("SCS") is supported by the Declaration of Richard A. Esposito, which is attached to this brief at Addendum 2. SCS is a member of petitioner Carbon Sequestration Council.

SCS is harmed by EPA's decision to include captured supercritical carbon dioxide streams in the definition of "solid waste" because SCS will incur costs to determine if any carbon dioxide stream it captures is a RCRA hazardous waste. Esposito Declaration ¶ 19; *see also* 76 Fed. Reg. at 48089 ("all generators that capture CO_2 . . . would incur costs to determine if the CO_2 stream is a RCRA

hazardous waste"). In addition, SCS will be injured by being put in a position of not being able to comply with the certification requirement of the final rule if it decides to contract for the geologic sequestration by a third-party recipient of some of the supercritical carbon dioxide that will be sent from the Kemper County energy facility through the commingled pipeline system. Esposito Declaration ¶ 20. SCS is injured by the need to make determinations as to whether captured carbon dioxide is RCRA hazardous under the final rule without having specific criteria that can be applied to supercritical carbon dioxide streams. Esposito Declaration ¶ 21.

Occidental Oil and Gas Corporation ("Occidental"), a member of petitioner American Petroleum Institute, is also injured by EPA's action. Occidental has extensive enhanced oil recovery operations using carbon dioxide. Declaration of Greg Hardin ¶¶ 3-5 ("Hardin Declaration") (attached at Addendum 2). The majority of fresh carbon dioxide that Occidental uses is from natural underground carbon dioxide reservoirs. Hardin Declaration ¶ 6. However, Occidental is "actively evaluating projects that will capture CO_2 emissions for use in its EOR operations." Hardin Declaration ¶ 6.

EPA's assertion of RCRA regulatory authority over captured carbon dioxide that is sequestered will influence Occidental's business decisions regarding the extent to which it will use captured carbon dioxide in its enhanced oil recovery

operations. Hardin Declaration ¶ 9. If the Court vacates EPA's assertion of authority, then Occidental's business decisions can be made free of the burden of potential regulation and liability under RCRA. Hardin Declaration ¶ 9. *See Sabre, Inc. v. DOT*, 429 F.3d 1113, 1119 (D.C. Cir. 2005) (standing found where it was "reasonably certain" that plaintiff's "business decisions will be affected").

Thus, SCS (a member of the Carbon Sequestration Council) and Occidental (a member of the American Petroleum Institute) are injured, and their injuries are traceable to EPA's decision not to exclude captured supercritical carbon dioxide streams from the definition of "solid waste." If this Court vacates EPA's decision, the injuries of SCS and Occidental will be redressed, because it will be clear that RCRA does not apply to their activities.

SCS and Occidental also have prudential standing. Their interests are "within the zone of interests to be protected *or regulated* by the statute . . . in question." *Association of Data Processing Serv. Orgs. v. Camp*, 397 U.S. 150, 153 (1970) (emphasis added). Or, as the Supreme Court most recently put it, these entities "fall[ ] within the class of plaintiffs whom Congress has authorized to sue." *Lexmark Int'l, Inc. v. Static Control Components, Inc.*, 134 S. Ct. 1377, 1386-88 (2014).

The Carbon Sequestration Council and the American Petroleum Institute have standing to sue on behalf of their members because 1) their members have

standing to sue in their own right (as shown above); 2) the interests they seek to protect are germane to their purposes as associations; and 3) neither the claim asserted nor the relief requested requires the participation of any individual association member. *See Sierra Club v. EPA*, 292 F.3d 895, 898 (D.C. Cir. 2002).

ARGUMENT

Standard of Review

Judicial review of final regulations promulgated under RCRA is governed by the Administrative Procedure Act, specifically, sections 701 through 706 of Title 5 of the United States Code. 42 U.S.C. § 6976(a) (2012). Section 706 provides, in relevant part, that:

> The reviewing court shall –
>
> . . .
>
> (2) hold unlawful and set aside agency action, findings, and conclusions found to be –
>
> (A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;
>
> . . . [or]
>
> (C) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right . . . .

5 U.S.C. § 706 (2012).

Where the issue is one of statutory construction, the reviewing court applies the two-step analytical framework set forth by the Supreme Court in *Chevron U.S.A. Inc. v. NRDC*, 467 U.S. 837, 842-843 (1984). Step 1 is to determine "whether Congress has directly spoken to the precise question at issue."

Transmission Agency of N. Cal. v. FERC, 495 F.3d 663, 673 (D.C. Cir. 2007) (quoting *Chevron*, 467 U.S. at 842). "If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress." *Id.* (quoting *Chevron*, 467 U.S. at 842-43). The analysis ends at *Chevron* Step 1 unless "the statute is silent or ambiguous," *id.*, but an ambiguity exists "only when the devices of judicial construction have been tried and found to yield no clear sense of congressional intent." *General Dynamics Land Sys. v. Cline*, 540 U.S. 581, 600 (2004).

If the statute is ambiguous, then – under Step 2 of the *Chevron* framework – the reviewing court will defer to the agency's construction of the statute, as long as that construction is reasonable. *Chevron*, 467 U.S. at 843-44. As the Supreme Court has explained more recently, where a statute is ambiguous, there is a presumption that Congress has given the implementing agency the authority to resolve the ambiguity. *Utility Air Regulatory Group v. EPA*, 134 S. Ct. 2427, 2439 (2014). Thus, "[t]he question for a reviewing court is whether in doing so the agency has acted reasonably and thus has 'stayed within the bounds of its statutory authority.'" *Id.* (quoting *Arlington v. FCC,* 133 S. Ct. 1863, 1868 (2013) (emphasis deleted by the Court)).

An agency interpretation cannot be considered reasonable under *Chevron* Step 2 unless "'the agency considered the matter in a detailed and reasoned

fashion' [and] recognized legitimate competing considerations and evaluated them conscientiously." *Rettig v. Pension Benefit Guaranty Corp.*, 744 F.2d 133, 151, 152 (D.C. Cir. 1984) (quoting *Chevron*, 467 U.S. at 865). Also, if the agency mistakenly assumes that its interpretation is compelled by the statute, the reviewing court can neither uphold that interpretation under *Chevron* Step 1, nor defer to it under *Chevron* Step 2, but must reverse. *PDK Laboratories Inc. v. DEA*, 362 F.3d 786, 798 (D.C. Cir. 2004).

An agency interpretation that is reasonable under *Chevron* Step 2 remains subject to reversal if it is "arbitrary or capricious." *American Petrol. Inst. v. EPA*, 216 F.3d 50, 57 (D.C. Cir. 2000) ("*API II*") ("The second step of *Chevron* analysis and *State Farm* arbitrary and capricious review overlap, but are not identical."). As relevant here, an agency interpretation can, even if it is found to be "reasonable," be arbitrary or capricious if it conflicts with another longstanding agency interpretation, and the conflict is not reasonably explained. *Independent Petrol. Ass'n of America v. Babbitt*, 92 F.3d 1248, 1258 (D.C. Cir. 1996).

And, as the Supreme Court has stated repeatedly, an agency interpretation which conflicts with the agency's earlier interpretation is entitled to "considerably less" deference than a consistently held agency view. *Watt v. Alaska*, 451 U.S. 259, 273 (1981); *INS v. Cardoza-Fonseca*, 480 U.S. 421, 446 n.30 (1987); *Good Samaritan Hosp. v. Shalala*, 508 U.S. 402, 417 (1993). The courts of appeals have

followed this principle in multiple cases. *See, e.g., Succar v. Ashcroft*, 394 F.3d 8, 36 (1st Cir. 2005) (agency entitled to "less than normal" deference where inconsistent with prior rulings); *NRDC v. EPA*, 526 F.3d 591, 602, 605-606 (9th Cir. 2008).

I. Carbon Dioxide Streams Do Not Have The Physical Form Of A RCRA "Solid Waste."

A. EPA's Assertion Of RCRA Authority Over Carbon Dioxide Streams Is Contrary To The Clear Intent Of Congress, As Expressed In The Statute.

To be subject to regulation under RCRA, a material must be a "solid waste." *AMC I*, 824 F.2d at 1179, 1193. In the preamble to the final rule, EPA acknowledged that supercritical fluids (such as carbon dioxide streams being injected for purposes of geological sequestration) are not mentioned in the statutory definition of "solid waste," but still concluded that such supercritical fluids are "RCRA statutory solid wastes." 79 Fed. Reg. 355 [JA __].

To determine – under *Chevron* Step 1 – whether Congress spoke directly to the question of EPA's authority over supercritical fluids, the Court must "exhaust the 'traditional tools of statutory construction.'" *NRDC v. Browner*, 57 F.3d 1122, 1125 (D.C. Cir. 1995) (quoting *Chevron*, 467 U.S. at 843 n.9). The starting point is the text of the statute. *Id.*

Section 1004(27) of RCRA provides that:

> The term "solid waste" means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility *and other discarded material, including solid, liquid, semisolid, or contained gaseous material* resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 1342 of Title 33, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923) [42 U.S.C. 2011 et seq.].

42 U.S.C. § 6903(27) (2012) (emphasis added). What is immediately striking about this definition is that it is not a definition simply of "waste," nor does it simply define "solid waste" as "discarded materials." Instead, it is a highly detailed definition of "solid waste" that specifies several physical forms ("liquid, semisolid, or contained gaseous") that would not be understood to be "solid" in common parlance.

This suggests a very thoughtful and deliberate effort to identify with specificity the materials to be covered by the statute. As this Court has observed in describing the set of thirty-nine defined terms in RCRA:

> This is definitional specificity of the first order. The very care evidenced by Congress in defining RCRA's scope certainly suggests that Congress was concerned about delineating and thus cabining EPA's jurisdictional reach.

AMC I, 824 F.2d at 1189.

Absent from the list of physical forms identified in the definition of "solid waste" are supercritical fluids. EPA acknowledges this, and specifically

recognizes that supercritical carbon dioxide has properties that are "intermediate between a liquid and a gas." 79 Fed. Reg. 355 [JA __]. EPA does not claim that supercritical fluids are encompassed by the word "liquid" or the word "gaseous." *See id.* ("[T]he RCRA definition of solid waste encompasses 'other discarded material' and *does not speak to materials such as supercritical fluids*.") (emphasis added).[4]

Given the evident care with which Congress wrote the definition of "solid waste" and the absence of supercritical fluids from the list of physical forms in that definition, the application of two traditional canons of statutory construction establish that Congress did not intend to cover supercritical fluids under RCRA. First is the maxim *expressio unius est exclusio alterius* (the mention of one thing implies the exclusion of things not mentioned). *See TVA v. Hill*, 437 U.S. 153, 188 (1978); *Albany Eng'g Corp. v. FERC*, 548 F.3d 1071, 1075-76 (D.C. Cir. 2008); *Nextwave Personal Commc'ns, Inc. v. FCC*, 254 F.3d 130, 152 (D.C. Cir. 2001); *Halverson v. Slater*, 129 F.3d 180, 185 (D.C. Cir. 1997).

In some cases, this Court has declined to apply the *expressio unius* canon in the administrative law context. *See, e.g., Mobile Commc'ns Corp. of Am. v. FCC*,

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[4] While supercritical fluids are dense like liquids, they behave like gases. *See* Response To Comments 83 [JA __]. As EPA puts it, supercritical fluids "have physical properties intermediate to those of gases and liquids." 76 Fed. Reg. 48075 [JA __]. But EPA made clear in the preamble to the final rule that it does not consider a supercritical fluid to be a "liquid." *See* 79 Fed. Reg. 355 [JA __].

77 F.3d 1399, 1405 (D.C. Cir. 1996). But as the Court has explained, that has been "only where the logic of the maxim . . . did not hold up in the statutory context." *Independent Ins. Agents of Am., Inc. v. Hawke*, 211 F.3d 638, 644 (D.C. Cir. 2000).

Here, *expressio unius* fits very well with the RCRA statutory context. In defining "*solid* waste" in a manner contrary to its ordinary meaning, Congress set forth particular physical forms (in addition to "solid") that it intended to cover. Had it meant to cover *all* physical forms, it could easily have said so.

Notably, one federal district court has applied the *expressio unius* canon to find that uncontained gases are not covered by the definition. *Center for Community Action and Envt'l Justice v. Union Pacific Corp.,* 42 E.L.R. 20122, 2012 U.S. Dist. LEXIS 83051 (C.D. Cal. 2012), *aff'd on other grounds*, No. 12-56086 (9th Cir. Aug. 20, 2014). Also, in interpreting the definition to exclude uncontained gases, EPA itself has implicitly applied *expressio unius*:

> [O]ur authority to identify or list a waste as hazardous under RCRA is limited to containerized or condensed gases (*i.e.*, section 1004(27) of RCRA [42 U.S.C. § 6903(27)] *excludes all other gases* from the definition of solid wastes and thus cannot be considered hazardous wastes).

54 Fed. Reg. 50968, 50973 (1989) (emphasis added) (citation to U.S. Code supplied) [JA __, __].[5] Accordingly, the canon should apply here, as well.

[5] This quotation is from a rulemaking in which EPA listed certain light ends that were condensed to liquids. It is clear from the context that EPA intended "condensed gases" to mean gases that are condensed to liquids and remain liquid at

The second relevant canon is the presumption against surplusage. That is, courts have the "duty 'to give effect, if possible, to every clause and word of a statute." *United States v. Menasche*, 348 U.S. 528, 538-39 (1955) (quoting *Montclair v. Ramsdell*, 107 U.S. 147, 152 (1883)). A court must avoid "any construction which implies that the Legislature was ignorant of the meaning of the language it employed." *Montclair*, 107 U.S. at 152.

Congress must have used the words "solid, liquid, semisolid, or contained gaseous material" for some good reason. If Congress meant to cover "discarded material" in *any* physical form – which is what EPA is essentially claiming here – Congress need not have specified the physical forms it did and could simply have defined "solid waste" to mean "discarded materials."

Nor do the specified physical forms logically serve as mere examples of what Congress meant by "discarded material." The physical form of a material has no bearing on its status as "discarded" *vel non*. Rather, various ways a material may be handled (*e.g.*, abandoned, landfilled, or incinerated material) would be logical examples of "discarded material." The specified physical forms logically relate back to the underlying term being defined ("solid waste"), and to the extent most of those physical forms would not ordinarily be considered "solid," they

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normal atmospheric temperature and pressure. *See* 54 Fed. Reg. 50972-73 [JA __-__]. Liquids are listed in the definition of "solid waste." 42 U.S.C. § 6903(27) (2012).

cannot reasonably be viewed as mere examples of "solid waste," but must be viewed as a deliberate and limited expansion of the ordinary meaning of "solid waste."

This Court has held that the canons of *expressio unius* and avoiding surplusage are "at their zenith" where "they apply in tandem." *Beverly Health & Rehab. Serv., Inc. v. NLRB*, 317 F.3d 316, 321 (D.C. Cir. 2003) (quoting *Independent Ins. Agents*, 211 F.3d at 645). Such is the case here.

In the preamble to the final rule, EPA implies that because the list of physical forms is preceded by the word "including," the list should be viewed as illustrative, and not exclusive. *See* 79 Fed. Reg. 355 (italicizing the phrase "other discarded material, including," and noting that carbon dioxide streams being sequestered are "of a similar kind to the other types of wastes specifically referenced" because they are "other discarded material") [JA __].

This Court has occasionally found the use of the word "includes" (as opposed to "means") to be expansive, *i.e.*, to bring in all of a term's ordinary meanings – even those not expressed. *Association of Private Sector Colleges and Univ. v. Duncan*, 681 F.3d 427, 451 (D.C. Cir. 2012); *Schumann v. Commissioner of Internal Revenue*, 857 F.2d 808, 811 (D.C. Cir. 1988). This is not a hard-and-fast rule, however. *See Petit v. United States Dept. of Educ.*, 675 F.3d 769, 791

(D.C. Cir. 2012) (refusing to apply the principle against an agency's interpretation of its regulation). Moreover, this concept cannot reasonably apply here.

In the first place, the definition of "solid waste" is a hybrid, in that it commences with the word "means," and only later uses "including." Moreover, there is no logical way for the use of "including" here to bring in "supercritical fluids." Supercritical fluids are not within the ordinary meaning of either "discarded materials" or "solid waste." The ordinary meaning of "discarded materials" has nothing to do with physical form, as discussed above. And the ordinary meaning of "solid waste" has *everything* to do with physical form – but supercritical fluids are certainly not within that ordinary meaning.

Moreover, reading the word "including" as making the list of physical forms merely illustrative – rather than exclusive – conflicts with EPA's longstanding position on uncontained gases. If the list were merely illustrative, and the only criterion were that a material be "discarded," then uncontained gases that are discarded would be within the definition of "solid waste" – contrary to EPA's position.[6]

In its Response to Comments, EPA relied repeatedly on the claim that the decision to discard transforms supercritical carbon dioxide into a "solid waste."

[6] As we argue in sections I.B. and I.C., below, this inconsistency also renders EPA's interpretation unreasonable under *Chevron* Step 2, as well as arbitrary and capricious.

Response To Comments at 37 ("That decision to discard brings the CO_2 stream within the RCRA definition of solid waste"), 119 ("a supercritical CO_2 stream *is a solid waste when it is to be discarded* through abandonment by disposing of the material in a UIC Class VI well") (emphasis added) [JA __, __]. In taking this approach, EPA has read "other discarded material" as swallowing the rest of the definition, and ignored the actual statutory text.

Although Congress' intent seems plain enough from the language of the statute, a review of the legislative history confirms that Congress deliberately chose the particular physical forms it wished to cover. The current definition of "solid waste" was enacted in 1976. Resource Conservation and Recovery Act of 1976, Pub. L. No. 94-580, § 2, 90 Stat. 2795, 2801. That definition expanded upon the definition of "solid waste" in the Solid Waste Disposal Act, which at that time was limited to "solid" materials:

> The term "solid waste" means garbage, refuse, and other discarded solid materials, including solid waste materials resulting from industrial, commercial, and agricultural operations, and from community activities but does not include solids or dissolved material in domestic sewage, or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial waste water effluents, dissolved materials in irrigation return flows or other common water pollutants.

Solid Waste Disposal Act, Pub. L. 89-272, § 203(4), 79 Stat. 998 (1965).

The Senate bill, S. 3622, contained the amendment that became the current definition of "solid waste." S. 3622, 94th Cong., 2d Sess. § 6 (1976). The report accompanying S. 3622 explained that

> The term "solid waste" in existing law is expanded *specifically to include* sludge from water or waste treatment plants or air pollution control facilities, *liquid, semisolid or contained gaseous materials*, and wastes from mining activities.

S. Rep. No. 988, 94th Cong., 2d Sess. 25 (1976) (emphasis added) (*reprinted in* I Senate Committee on Env't and Public Works, 102d Cong., 1st Sess., A Legislative History of the Solid Waste Disposal Act, As Amended 343 (1991) ("Legislative History").

The same Senate bill defined "hazardous waste" in relevant part as follows:

> The term "hazardous waste" means a waste or combination of wastes of a solid, liquid, contained gaseous, or semisolid form, including radioactive material . . . .

S. 3622, 94th Cong., 2d Sess. § 6 (1976). The accompanying report explained:

> "Hazardous waste" means any waste – solid, semisolid, liquid, or contained gas – including some radioactive materials, which the administrator determines may cause or contribute to creation of serious adverse health effects.
>
> . . .
>
> These wastes can take the form of solids, sludges, liquids, or contained gases. The definition of hazardous wastes is not confined to solid waste.

S. Rep. No. 988, 94th Cong., 2d Sess. 25-26 (1976) (*reprinted in* Legislative History 343-44).

In the final enactment of RCRA, the term "hazardous waste" was defined in terms of "solid waste, or combination of solid wastes." Pub. L. No. 94-580, § 2, 90 Stat. 2795, 2799 (1976). The change from the Senate bill's use of the phrase "waste or combination of wastes of a solid, liquid, contained gaseous, or semisolid form" is not explained in the legislative history, but presumably Congress simply used the "solid waste" terminology because it was already amending the definition of "solid waste" specifically to cover "solid, liquid, semisolid, or contained gaseous material."

In any event, the legislative history shows that Congress chose its words deliberately. Congress expanded the definition of "solid waste . . . specifically to include . . . liquid, semisolid or contained gaseous material." S. Rep. No. 988, 94th Cong., 2d Sess. 25 (1976) (*reprinted in* Legislative History 343). There is nothing in the legislative history to suggest that Congress meant the specified physical forms to be merely illustrative or for EPA to have the authority to expand the list of physical forms further.

Nor is there anything in the rest of the Act, its structure, or its purposes that suggests Congress wanted EPA to be able to expand the list of regulated physical forms. Like most such statutes, RCRA does grant the Administrator of EPA the authority to "prescribe . . . such regulations as are necessary to carry out his functions under this chapter." 42 U.S.C. § 6912(a)(1) (2012). But the definition of

"solid waste" serves to define and limit the Administrator's "functions" under RCRA.

As this Court has explained, "where the statutory text is clear, an agency may not use general clauses to redefine the jurisdictional boundaries set by the statute." *Financial Planning Ass'n v. SEC*, 482 F.3d 481, 489 (D.C. Cir. 2007). *See also American Petrol. Inst. v. EPA*, 52 F.3d 1113, 1119 (D.C. Cir. 1995) ("EPA cannot rely on its general authority to make rules necessary to carry out its functions when a specific statutory directive defines the relevant functions of EPA in a particular area.").

Because Congress clearly intended that RCRA cover only solid, liquid, semisolid, and contained gaseous materials, EPA's assertion of RCRA regulatory authority over supercritical fluids exceeds EPA's statutory authority and is contrary to law. Accordingly, the Court should vacate EPA's assertion of authority. *See API II*, 216 F.3d at 58 (vacating "EPA's decision declining to exclude oil-bearing wastewaters from the statutory definition of solid waste").

B. Assuming – *Arguendo* – That The Statute Is Ambiguous, EPA's Interpretation Is Not Reasonable And Is Not Entitled To Deference.

As shown above, the intent of Congress is clear: the term "solid waste" is limited to solid, liquid, semisolid, and contained gaseous materials. Yet even

assuming that Congress' intent is not clear (*i.e.*, that the statute is ambiguous), EPA's interpretation is not reasonable and is not entitled to deference.

In the first place, the Agency has mistakenly assumed that the statute *compels* the conclusion that carbon dioxide streams being sequestered in the form of supercritical fluids are "solid wastes." In the preamble to the final rule, the Agency briefly parses the statutory language, and concludes that such streams "are, therefore, RCRA statutory solid wastes." 79 Fed. Reg. 355 [JA __].

Also, in responding to the comment of the Carbon Sequestration Council that EPA should promulgate an exclusion from the definition of "solid waste," rather than an exclusion from the definition of hazardous waste,[7] EPA said:

> EPA disagrees. A solid waste regulatory exclusion would need to be based upon a finding that CO_2 streams sent to a UIC Class VI well for purposes of GS are not being discarded . . . .

Response to Comments Document 27 (2013) [Docket ID No. EPA-HQ-RCRA-2010-0695-0108] [JA __]. By this response, EPA made clear its belief that a finding that the carbon dioxide streams are not "discarded" would be the *only* way that EPA could exclude the streams from the definition of "solid waste" – a finding that supercritical fluids are not "solid wastes" was not considered an available

[7] Pursuant to RCRA, a waste that is not a "solid waste" by definition cannot be a "hazardous waste." 42 U.S.C. § 6903(5).

alternative.[8] *See also id.* at 189 ("RCRA expressly applies to 'solid wastes,' which EPA has explained elsewhere includes CO_2 streams . . . The RCRA regulations apply by their terms.") [JA __]. Nowhere in the record does EPA even consider that the supercritical status of the streams might be a plausible basis for excluding them from the definition of "solid waste."

Whether or not the Court agrees with the Petitioners that Congress plainly did not intend to cover supercritical fluids in the definition of "solid waste," it is certainly at least *plausible* that Congress did not intend to cover supercritical fluids. And, while Petitioners do not concede that the statute is ambiguous, if it were ambiguous, then EPA presumably would have the discretion to promulgate an exclusion from the definition of "solid waste," as requested by the Petitioners and other commenters. Yet EPA declined even to consider that alternative.

The law in this Circuit is clear that where the agency mistakenly assumes its interpretation is compelled, the Court can neither uphold the interpretation under *Chevron* Step 1 nor defer to the interpretation under *Chevron* Step 2, but must reverse. *Secretary of Labor v. National Cement Co. of Cal.*, 494 F.3d 1066, 1073

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[8] As explained in the Statement of the Case, *supra*, EPA was aware of the argument that supercritical fluids are not "solid wastes" because various commenters made that argument. *See, e.g.,* API Comments 5 ("CO_2 streams do not have the physical form of a solid waste. . . . Supercritical states of material, such as is relevant for CO_2, are not explicitly listed.") [JA __].

(D.C. Cir. 2007); *PDK Laboratories Inc. v. DEA*, 362 F.3d 786, 797-98 (D.C. Cir. 2004). The Court has explained that

> *Chevron* step 2 deference is reserved for those instances when an agency recognizes that the Congress's intent is not plain from the statute's face. "In precisely those kinds of cases, it is incumbent upon the agency not to rest simply on its parsing of the statutory language" – "[it] must bring its experience and expertise to bear in light of competing interests at stake."

Peter Pan Bus Lines, Inc. v. Federal Motor Carrier Safety Admin., 471 F.3d 1350, 1354 (D.C. Cir. 2006) (quoting *PDK Laboratories*, 362 F.3d at 797-98).

Moreover, EPA's interpretation is unreasonable precisely because EPA has not brought "its experience and expertise to bear in light of competing interests at stake." In other words, EPA neither "considered the matter in a detailed and reasoned fashion," *Chevron*, 467 U.S. at 865, nor "recognized legitimate competing considerations and evaluated them conscientiously," *Rettig v. Pension Benefit Guaranty Corp.*, 744 F.2d 133, 152 (D.C. Cir. 1984).

EPA's parsing of the statutory language was not even complete. EPA did not consider the *expressio unius* canon or the canon forbidding surplusage. Nor did EPA examine the legislative history. Nor did EPA explain why – if at all – it was important for EPA to subject the subsurface injection of carbon dioxide to regulation under RCRA, when such injection is already subject to comprehensive regulation under the Safe Drinking Water Act. Nor, as discussed in detail in section I.D., below, did EPA deal reasonably with the problem that there is no

clear way to apply the RCRA tests and criteria for determining "hazard" to these materials.

Moreover, EPA's interpretation is unreasonable because it conflicts with EPA's longstanding interpretation with respect to uncontained gases. Since the 1980s, it has been EPA's position that

> [O]ur authority to identify or list a waste as hazardous under RCRA is limited to containerized or condensed gases (*i.e.*, section 1004(27) of RCRA [42 U.S.C. § 6903(27)] excludes all other gases from the definition of solid wastes and thus cannot be considered hazardous wastes). . . .
>
> EPA's previously issued guidance concerning fume incinerators (contained in the preamble to the incineration regulations) remains in effect. See 47 FR 27530, June 24, 1982. Fume incinerators are installed as air pollution control devices pursuant to regulations under the Clean Air Act; they are used to destroy gaseous emissions from various industrial processes. EPA concluded that, in general, RCRA standards do not apply to fume incinerators because the input (an uncontainerized gas) is not a solid waste according to the definition set forth in § 261.2.

54 Fed. Reg. 50968, 50973 & n.5 (1989) (citation to U.S. Code supplied) [JA __, __]. This quotation is from a rulemaking in which EPA listed as hazardous wastes certain gases (light ends) that were condensed to *liquid*. It is clear from the context that EPA intended "condensed gases" to mean gases that are condensed to liquid form.

Thus, according to longstanding EPA policy, uncontained or "uncontainerized" gases are not "solid wastes." Only "containerized" gases or

gases condensed to liquid form can be "solid wastes;" all other gases are excluded. Further, the EPA Administrator has clarified that "containerized gases" do not include gases that are contained "in the broad sense of being bound or controlled and not being emitted to the atmosphere," but only gases that are "containerized in the narrower sense of being in an individual container such that the gas is amenable to shipment." *In Re: BP Chemicals Americas Inc., Lima Ohio,* 3 E.A.D. 667, 670 (1991) [JA __, __].

The carbon dioxide streams at issue here are captured from gaseous emissions (*e.g.*, from a power plant). 79 Fed. Reg. 364 (defining "carbon dioxide stream") [JA __]. These gases are transported by pipeline to the injection well. 79 Fed. Reg. 355 [JA __]. At the point of injection, the carbon dioxide is in a supercritical state in a pipeline; it is not a liquid; and it is not contained in a movable vessel or container. *See id.* Under longstanding EPA policy, then, such carbon dioxide should not be considered "solid waste" because it is a gas that is neither containerized nor condensed to liquids.

EPA attempts to ignore the fact that it has no authority to regulate uncontained gases such as the carbon dioxide streams at issue by stating that it does not consider the carbon dioxide streams to be gases at the point of injection (but rather, "supercritical fluids"). Based on this ploy, EPA then asserts that the streams are "other discarded material" for the purpose of classifying those streams

as "solid wastes." Yet, this is contrary to the clear statutory language granting EPA authority to regulate only solid, liquid, semisolid or *contained gaseous* materials, and EPA's longstanding policy to the same effect.

But even if the carbon dioxide streams in the state of supercritical fluids are considered something other than gases (or say, "former gases") at the point of injection, they are also not in a form identified in the definition of "solid waste." Implicit in EPA's historical position that all gases *other* than containerized gases (or gases condensed to liquid form) are *excluded* from the definition of "solid waste" is the canon of *expressio unius.* In other words, under EPA's historical position, it is not enough that a material (like an uncontained gaseous emission) be "other discarded material." The material's physical form must also be enumerated in the definition of "solid waste."

EPA's historical position with regard to gases conflicts directly with EPA's position in this rulemaking. Here, EPA says it does not matter that supercritical fluids are not mentioned in the definition of "solid waste" – it is sufficient that EPA considers the carbon dioxide streams to be "other discarded material." 79 Fed. Reg. 355 [JA __]. The record provides no reasoned explanation for this inconsistency. An agency's interpretation which conflicts with an earlier interpretation is entitled to "considerably less" deference than a consistently held agency view. *Good Samaritan Hosp. v. Shalala, supra*, 508 U.S. at 417 (1993)

(citing cases); *Natural Resources Defense Council v. EPA*, *supra*, 526 F.3d at 602, 605-606 (same).

In sum, EPA's interpretation is unreasonable and not entitled to *Chevron* deference because 1) EPA mistakenly assumed its interpretation is compelled by the statute; 2) EPA did not consider the matter in a detailed and reasoned fashion, as contemplated by *Chevron*; and 3) EPA's position conflicts with its longstanding position on uncontained gases. Accordingly, the Court should vacate EPA's assertion of RCRA authority over carbon dioxide streams being injected for geological sequestration.

C. EPA's Assertion Of RCRA Authority Over Carbon Dioxide Streams Is Arbitrary And Capricious Because It Is Inconsistent With EPA's Longstanding Position Respecting Uncontained Gases.

As shown above, EPA's position here with respect to carbon dioxide streams conflicts with its longstanding position on uncontained gases, and that inconsistency is not reasonably explained. This Court has said that such an unexplained inconsistency could result either in a finding that the agency's interpretation is unreasonable under *Chevron* (as we argue above) or in a finding that the agency has acted arbitrarily (as we now argue). *Independent Petrol. Ass'n of Am. v. Babbitt*, 92 F.3d 1248, 1258 (D.C. Cir. 1996). "The two analytic frameworks in this case produce the same result." *Id.*

"A long line of precedent has established that an agency action is arbitrary when the agency offered insufficient reasons for treating similar situations differently." *Transactive Corp. v. United States*, 91 F.3d 232, 237 (D.C. Cir. 1996). *See National Ass'n of Broadcasters v. FCC*, 740 F.2d 1190 (D.C. Cir. 1984). Put another way, "[a]n agency in its deliberations is under an obligation to follow, distinguish, or overrule its own precedent." *Local 777, Democratic Union Organizing Comm. v. NLRB*, 603 F.2d 862, 872 (D.C. Cir. 1978). And where the agency overrules its precedent, it must provide a reasoned explanation for doing so. *National Ass'n of Broadcasters v. FCC*, 740 F.2d at 1201. EPA has fulfilled none of those obligations here.

Rather, as explained at length above, EPA has taken a position contrary to its longstanding position with respect to uncontained gases – and has done so without offering any explanation in the administrative record. EPA declined even to attempt to justify the inconsistency with its long-standing interpretation of the law and instead simply insisted that the carbon dioxide in question is like the actually enumerated substances *because* it is "'other discarded material' from industrial and commercial operations." 79 Fed. Reg. 355 [JA _]; Response to Comments 9-10, 35-36, 66-67, 68, 118, 184 [JA __-__, __-__, __-__, __, __, __].

Therefore, EPA's assertion of RCRA regulatory authority over carbon dioxide streams was arbitrary and capricious. Accordingly, the Court should

vacate that assertion of authority. *See API II*, 216 F.3d at 58 (vacating "EPA's decision declining to exclude oil-bearing wastewaters from the statutory definition of solid waste").

D. EPA Did Not Provide A Reasoned Response To Concerns About The Lack Of Specified Means To Determine Hazard (Or The Absence Of Hazard).

The regulatory framework that EPA has developed to regulate the management of solid and hazardous wastes does not work for carbon dioxide, as the Carbon Sequestration Council, the American Petroleum Institute and others noted in their comments to EPA both before and after EPA proposed its rule.[9/] Not only did EPA fail to provide a satisfactory rationale for not deciding to exclude captured supercritical carbon dioxide because of its physical form as it could have done, EPA also failed to provide any reasonable explanation in responding to those comments.

In particular, as explained below, in response to the concern that the tests and criteria for determining whether materials are hazardous cannot be applied to carbon dioxide streams, EPA acknowledged that the regulated community was on its own until an unspecified time in the future when it would provide "additional guidance." Response To Comments at 43 [JA __]. This failure to deal reasonably

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9/ *See, e.g.*, Comments of Chevron 1-2 [JA __-__]; API Comments 3-4 [JA __-__]; CSC Comments 10-11 [JA __, __].

with valid concerns about how to comply with the law was arbitrary and capricious.

EPA's previous decision to include condensed gases within the definition of "solid waste" while excluding substances that remain gaseous at standard pressure and temperature was understandable because the tests and criteria for identifying when a "solid waste" is hazardous under RCRA can be applied to condensed gas that has become a liquid and remains a liquid at normal atmospheric pressure and temperature – but not to a substance that remains gaseous. Commenters at several stages in the development of this rule expressed this concern.

As EPA noted in the preamble to the 2011 proposed rule, "[m]any commenters also expressed concern over the uncertainty in determining how the RCRA hazardous waste regulations, including the hazardous waste identification issues described here, apply to CO_2 streams being sequestered in UIC Class VI wells." 76 Fed. Reg. 48078 [JA __]. In responding to those concerns, EPA first noted that "no hazardous waste listings apply specifically to CO_2 streams," thus narrowing the consideration, as "a CO_2 stream could only be defined as a hazardous waste if it exhibits a hazardous waste characteristic as defined in 40 CFR part 261, subpart C." *Id.*

Then EPA acknowledged the commenter's concern "[r]egarding the feasibility of testing CO_2 streams"—*i.e.*, that the tests EPA has developed for

determining when a RCRA "solid waste" exhibits a hazardous characteristic cannot be conducted on supercritical carbon dioxide. *Id.* But instead of explaining how the assessment of supercritical carbon dioxide can be conducted under the RCRA regulations, EPA demurred.

First, EPA pointed out that "the hazardous waste regulations allow generators to apply their knowledge—in lieu of testing—of the hazard characteristic of a waste, in light of the materials or processes used, to determine whether that waste is a characteristic hazardous waste under RCRA." *Id.* EPA cautioned, however, that "[a]ny persons claiming that a waste is non-hazardous, based on knowledge in lieu of testing, should be prepared to substantiate this claim." 76 FR 48078, n.21 [JA __]. Having admitted that the prescribed tests cannot be used on supercritical carbon dioxide, and in light of the RCRA hazardous criteria having been developed for other forms of substances, EPA offered no specific guidance on how a facility capturing carbon dioxide streams could "substantiate" their claim that a waste is non-hazardous – essentially telling operators they are on their own, with potential enforcement consequences.

Instead of offering guidance on how to substantiate claims that supercritical carbon dioxide streams are nonhazardous under RCRA, EPA offered the following: "EPA also notes that methods exist for sampling and analyzing ***gaseous emissions*** in order to identify and quantify hazardous constituents that

may be present." 76 Fed. Reg. 48078 (emphasis added) [JA __]. Thus, EPA looked outside RCRA, telling capturers of carbon dioxide streams to analyze those supercritical streams using the analytical methods intended for *uncontained gases* that are not RCRA "solid waste" at all.

And as to what is to be done with the determined constituent levels in these gases, EPA does not explain in the record. Perhaps the regulated community could presume that those levels are to be compared with the levels that EPA sets out in the RCRA regulations for assessing liquids or solids, but EPA does not say so. Nor does EPA provide any justification for simply presuming that the concentrations of constituents in gas will pose the same hazardousness as the concentrations of constituents in liquids or solids.

Commenters on the 2011proposed rule reiterated their concerns. For example, the Carbon Sequestration Council said

> EPA acknowledges that CO_2 streams cannot be tested by any existing test to determine whether those streams – even if a solid waste – are hazardous. How is the capturer of a CO_2 stream supposed to make this assessment if the existing tests cannot be used? If a CO_2 producer were required to classify a material based on "knowledge" rather than testing, what standard can be used to substantiate this claim?

Response To Comments 42 [JA __].

In responding to comments in the final rule, EPA – once again – failed to provide any helpful response to this dilemma:

> EPA appreciates these commenters' concerns regarding the application of the hazardous waste regulations to supercritical CO_2 streams being sequestered. . . . EPA acknowledges that additional guidance in determining when supercritical CO_2 streams would be defined as hazardous under the Toxicity Characteristic may be useful, however EPA also notes that in light of the early state of data development in this area, EPA intends to bring additional clarity to the regulatory regime through this rule, by establishing a conditional exclusion from the definition of hazardous waste that would apply in the event a generator determines that its CO_2 streams exhibit a RCRA hazardous characteristic, or, where a generator chooses to comply with the conditional exclusion as a precautionary matter, if they are unsure of the hazardous waste status of their CO_2 stream.

Id. at 43 [JA __]. Thus, EPA acknowledged a generator's inability to determine whether its carbon dioxide stream is hazardous under the RCRA regulations, and seemed to suggest the solution is to rely upon the conditional exclusion for injection into Class VI wells.

But this passive solution denies generators of carbon dioxide streams the compliance opportunity that all other generators have: testing to determine the absence of hazard. Also, it does nothing at all for carbon dioxide streams that may be managed in ways other than injection in a Class VI well, such as injection in a Class V well.

Moreover, where a generator chooses to rely upon the conditional exclusion for injection into Class VI wells, the generator retains ongoing liability for violations that occur even after the carbon dioxide stream leaves its control. In the preamble to the final rule, EPA explained that

> [A] violation of a condition at any point in the management of a CO_2 stream (that is otherwise hazardous) would result in that CO_2 stream being subject to all applicable subtitle C regulatory requirements from the point of generation.

79 Fed. Reg. 357 [JA __]. Yet in this circumstance the generator lacks any ability to establish that its carbon dioxide stream was not "otherwise hazardous."

Accordingly, EPA's conclusion that carbon dioxide streams are "solid wastes" potentially subject to RCRA, while failing to provide a resolution to the dilemma faced by generators of demonstrating the non-hazardous characteristics of their supercritical carbon dioxide streams, is clearly arbitrary and capricious.

II. Carbon Dioxide That Is Captured And Stored Is Not "Solid Waste," Because It Is Not "Discarded."

A. EPA's Position Is Inconsistent With The Ordinary Meaning Of "Discarded."

In *AMC I*, this Court made clear that the pivotal word "discarded" in the definition of "solid waste" is to be understood in its ordinary sense. Specifically, the Court held that "Congress clearly and unambiguously expressed its intent that 'solid waste' (and therefore EPA's regulatory authority) be limited to materials that are 'discarded' by virtue of being *disposed of, abandoned, or thrown away*." 824 F.2d at 1193 (emphasis added).

The Court reaffirmed its *AMC I* holding in *Association of Battery Recyclers v. EPA*, 208 F.3d 1047, 1052-56 (D.C. Cir. 2000):

> [T]he *AMC I* court stressed, again and again, that it was interpreting "discarded" to mean what it ordinarily means. *To say that when something is saved it is thrown away is an extraordinary distortion of the English language.*

Id. at 1053 (emphasis added).

In the rule under review here, EPA insisted that carbon dioxide captured from emissions sources and stored or "sequestered" in Class VI wells must be considered "discarded" (and hence, "solid waste"), *even where the carbon dioxide may later be withdrawn for productive use*. 79 Fed. Reg. 354-55 [JA __-__]; Response To Comments 12-13 [JA __-__]. EPA's position is not consistent with the ordinary meaning of the word "discarded."

Carbon dioxide "capture" prevents air emissions of carbon dioxide from being abandoned or discarded into the ambient air. *See* API Comments 6 [JA __]. The captured carbon dioxide is then transported in pipelines and stored or sequestered in secure geologic formations. *See id.* In general, "capture" and "storage" (or "sequestration") are inconsistent with "disposal" or "abandonment." *See id.*

Regardless of whether or not it would be considered to be disposal or abandonment where an operator injects the carbon dioxide stream into a Class VI well with no intention of ever withdrawing it, that intention cannot always be presumed. Where the operator injects the carbon dioxide stream with the intent that it may later be withdrawn for productive use, then the operator has "saved" the

stream, *Battery Recyclers*, 208 F.3d at 1053, and not abandoned, disposed, or thrown it away.[10]

This argument is not undermined by the holding in *American Mining Congress v. EPA*, 907 F.2d 1179 (D.C. Cir. 1990) ("*AMC II*"), in which the petitioners claimed that certain sludges from mining facility wastewater that were "stored in surface impoundments and that *may* at some time in the future be reclaimed are not 'discarded.'" *Id.* at 1186 (emphasis in original). The Court deferred to EPA's judgment that the sludges were "discarded" because they were derived from wastewater and stored in impoundments that threatened the health and environment of nearby residents. *Id.*

The present case is distinguishable from *AMC II* on both grounds. As the Court later explained in *Battery Recyclers*, "[t]he point of *AMC II* . . . is that once material [*i.e.*, wastewater] qualifies as 'solid waste,' something derived from it retains that designation even if it might be reclaimed and reused at some future time." 208 F.3d at 1056 (footnote omitted). Here, in contrast, the carbon dioxide stream does not derive from "solid waste," but from industrial processes. *See id.* In other words, it has not yet *become* a "solid waste."

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[10] EPA acknowledges that carbon dioxide has multiple legitimate commercial uses, including enhanced oil recovery, urea yield boosting, food processing and packaging, beverage carbonation, and wine making. 79 Fed. Reg. 355 & n.5 [JA __]. EPA also acknowledges that injection of carbon dioxide for enhanced oil recovery is not a "waste management activity." *Id.* at 355 [JA __].

Moreover, in *AMC II*, surface impoundments used for storage were found to pose a significant threat to human health or the environment. In contrast, EPA has found that Class VI wells used for carbon dioxide sequestration are protective of human health and the environment. 79 Fed. Reg. 356 [JA __]. Also, while injection wells used for disposal of hazardous waste can be subject to RCRA, unlike surface impoundments, injection wells are not a "central focus of RCRA's regime," *AMC II*, 907 F.2d at 1187. *See* S. Rep. No. 284, 98th Cong., 1st Sess. 13 (1983) (calling for minimization of land disposal, "particularly in landfills and surface impoundments").

Additionally, the wastes disposed in Class I hazardous waste disposal wells could not be immediately routed as an alternative for productive commercial use. As EPA noted within days of publishing its final rule, "[g]eologic storage options also include use of CO_2 in EOR." 79 Fed. Reg. 1430, 1473 (2014). EPA explained that, "[w]hile natural sources of CO_2 comprise the majority of CO_2 supplied for EOR operations, recent developments targeting anthropogenic sources of CO_2 (e.g., ethanol plants, gas processing plants, refineries, power plants) have expanded or led to planned expansions in existing infrastructure related to CO_2-EOR." *Id.* at 1474.

This case is also distinguishable because the potential for future use of carbon dioxide in enhanced oil recovery is not unrealistic. EPA has recognized

that "the geographic scope of areas in which EOR is available to defray the costs of CCS should be considered to be large". 79 Fed. Reg. 1430, 1478 (2014). "CO_2-EOR is the fastest-growing EOR technique in the U.S." (*id.* at 1474) and "recent developments targeting anthropogenic sources of CO_2 (e.g., ethanol plants, gas processing plants, refineries, power plants) have expanded or led to planned expansions in existing infrastructure related to CO_2-EOR." *Id.*

Indeed, "[s]everal hundred miles of dedicated CO2 pipeline is under construction, planned, or proposed." *Id.* That geologically stored carbon dioxide could be a source for future use is also not unrealistic because "[t]he CO_2 supply for EOR operations currently is largely obtained from natural underground formations or domes that contain CO_2." *Id.* Future supplies will come from anthropogenic sources:

> Based on a recent resource assessment by the DOE, the application of next generation CO_2-EOR technologies would significantly increase oil production areas, further expanding the geographic extent and accessibility of CO_2-EOR operations in the U.S. Additionally, oil and gas fields now considered to be 'depleted' may resume operation because of increased availability and decreased cost of anthropogenic CO_2, and developments in EOR technology, thereby increasing the demand for and accessibility of CO_2 utilization for EOR.

Id. (footnote omitted).

In sum, carbon dioxide streams that are stored or sequestered in Class VI wells with the intent that they may later be withdrawn for productive use are

"saved" and not "discarded." EPA's position to the contrary conflicts with Congress' intent that "discarded" be understood in its ordinary sense.

B. EPA Unreasonably Dismissed The Argument That Carbon Dioxide Stored In Class VI Wells For Later Productive Use Is Not "Discarded."

EPA summarily dismissed the argument that carbon dioxide that is captured and then stored in Class VI wells for later productive use is saved, and not discarded. EPA's rationale for determining that all carbon dioxide streams sent to Class VI wells for purposes of sequestration are "discarded" appears in the Response To Comments at 12 [JA __]. The first part of EPA's rationale makes perfect sense: "a supercritical CO_2 stream is a solid waste when it is to be *discarded through abandonment by disposing of the material* in a UIC Class VI well . . . ." *Id.* (emphasis added).

But in addressing the circumstance where the operator intends that the carbon dioxide be held for later withdrawal for productive use, EPA said

> [I]njection of a CO_2 stream into a Class VI well for purposes of [geologic sequestration] is effectively "getting rid of" the CO_2 stream by keeping it underground indefinitely. The fact that the sequestration of CO_2 streams into deep geologic formations is at times labeled as "long-term containment" or "long-term storage," or that offset credits may be transacted, does not change this view.
>
> Regarding the comment that CO_2 streams injected into saline formations under UIC Class VI wells are not disposal, because they can later be withdrawn, EPA disagrees and reiterates that CO_2 streams injected into UIC Class VI wells are solid wastes.

Id. In other words, "long-term storage" of carbon dioxide is "discard" simply *because EPA says so.*

Such an *ipse dixit* cannot substitute for the "detailed and reasoned" consideration called for by *Chevron* Step 2. It is also arbitrary and capricious. *API II*, 216 F.3d at 57 ("As English teachers have long taught, a conclusion is not 'clear' or 'obvious' merely because one says so."). EPA's response is particularly unreasonable given its statement in the economic analysis for the final rule, with respect to the "six potential CO_2 Class VI UIC sequestration facilities" considered, that "[i]t is possible that these projects may store CO_2 in domes as a staging point for future enhanced oil recovery (EOR) or enhanced gas recovery (EGR), and working fluids for fracturing tight gas sands and shale." Assessment of the Potential Costs, Benefits, and Other Impacts, Hazardous Waste Management System: Conditional Exclusion For Carbon Dioxide (CO2) Streams in Geologic Sequestration Activities 7-8 (2013), Docket No. EPA-HQ-RCRA-2010-0695-0092 [JA __-__].

CONCLUSION

EPA's assertion of RCRA regulatory authority over carbon dioxide streams (based on EPA's interpretation that such streams are "solid wastes") exceeds EPA's statutory authority; is contrary to law; and is arbitrary and capricious. The Court should vacate EPA's assertion of authority.

DATED: August 28, 2014

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CERTIFICATE OF COMPLIANCE

1. This brief complies with the type-volume limitation of Fed. R. App. P. 32(a)(7)(b), because this brief contains 12,412 words, excluding the parts of the brief exempted by Fed. R. App. P. 32(a)(7)(B)(iii) and Circuit Rule 32(a)(1).

2. This brief complies with the typeface requirements of Fed. R. App. P. 32(a)(5) and the type style requirements of Fed. R. App. P. 32(a)(6), because this brief has been prepared in a proportionally spaced typeface using Microsoft Word 2007 in Times New Roman font size 14.

DATED: August 28, 2014 /s/Thomas Sayre Llewellyn

No. 14-1046 (and consolidated case)

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

CARBON SEQUESTRATION COUNCIL, *et al.*,

Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *et al.*,

Respondents.

ON PETITION FOR REVIEW OF FINAL REGULATIONS PROMULGATED BY THE ENVIRONMENTAL PROTECTION AGENCY

OPENING BRIEF OF PETITIONERS CARBON SEQUESTRATION COUNCIL, SOUTHERN COMPANY SERVICES, INC., AND AMERICAN PETROLEUM INSTITUTE

ADDENDUM I:

PERTINENT STATUTES AND REGULATIONS

TABLE OF CONTENTS

Statutes

Regulations

§ 706. Scope of review

To the extent necessary to decision and when presented, the reviewing court shall decide all relevant questions of law, interpret constitutional and statutory provisions, and determine the meaning or applicability of the terms of an agency action. The reviewing court shall—

(1) compel agency action unlawfully withheld or unreasonably delayed; and

(2) hold unlawful and set aside agency action, findings, and conclusions found to be—

(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

(B) contrary to constitutional right, power, privilege, or immunity;

(C) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right;

(D) without observance of procedure required by law;

(E) unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of an agency hearing provided by statute; or

(F) unwarranted by the facts to the extent that the facts are subject to trial de novo by the reviewing court.

In making the foregoing determinations, the court shall review the whole record or those parts of it cited by a party, and due account shall be taken of the rule of prejudicial error.

(Pub. L. 89–554, Sept. 6, 1966, 80 Stat. 393.)

HISTORICAL AND REVISION NOTES

Derivation	*U.S. Code*	*Revised Statutes and Statutes at Large*
.....	5 U.S.C. 1009(e).	June 11, 1946, ch. 324, § 10(e), 60 Stat. 243.

Standard changes are made to conform with the definitions applicable and the style of this title as outlined in the preface of this report.

ABBREVIATION OF RECORD

Pub. L. 85–791, Aug. 28, 1958, 72 Stat. 941, which authorized abbreviation of record on review or enforcement of orders of administrative agencies and review on the original papers, provided, in section 35 thereof, that: "This Act [see Tables for classification] shall not be construed to repeal or modify any provision of the Administrative Procedure Act [see Short Title note set out preceding section 551 of this title]."

CHAPTER 8—CONGRESSIONAL REVIEW OF AGENCY RULEMAKING

§ 801. Congressional review

(a)(1)(A) Before a rule can take effect, the Federal agency promulgating such rule shall submit to each House of the Congress and to the Comptroller General a report containing—

(i) a copy of the rule;

(ii) a concise general statement relating to the rule, including whether it is a major rule; and

(iii) the proposed effective date of the rule.

(B) On the date of the submission of the report under subparagraph (A), the Federal agency promulgating the rule shall submit to the Comptroller General and make available to each House of Congress—

(i) a complete copy of the cost-benefit analysis of the rule, if any;

(ii) the agency's actions relevant to sections 603, 604, 605, 607, and 609;

(iii) the agency's actions relevant to sections 202, 203, 204, and 205 of the Unfunded Mandates Reform Act of 1995; and

(iv) any other relevant information or requirements under any other Act and any relevant Executive orders.

(C) Upon receipt of a report submitted under subparagraph (A), each House shall provide copies of the report to the chairman and ranking member of each standing committee with jurisdiction under the rules of the House of Representatives or the Senate to report a bill to amend the provision of law under which the rule is issued.

(2)(A) The Comptroller General shall provide a report on each major rule to the committees of jurisdiction in each House of the Congress by the end of 15 calendar days after the submission or publication date as provided in section 802(b)(2). The report of the Comptroller General shall include an assessment of the agency's compliance with procedural steps required by paragraph (1)(B).

(B) Federal agencies shall cooperate with the Comptroller General by providing information relevant to the Comptroller General's report under subparagraph (A).

(3) A major rule relating to a report submitted under paragraph (1) shall take effect on the latest of—

(A) the later of the date occurring 60 days after the date on which—

(i) the Congress receives the report submitted under paragraph (1); or

(ii) the rule is published in the Federal Register, if so published;

(B) if the Congress passes a joint resolution of disapproval described in section 802 relating to the rule, and the President signs a veto of such resolution, the earlier date—

(i) on which either House of Congress votes and fails to override the veto of the President; or

(ii) occurring 30 session days after the date on which the Congress received the veto and objections of the President; or

(C) the date the rule would have otherwise taken effect, if not for this section (unless a joint resolution of disapproval under section 802 is enacted).

(4) Except for a major rule, a rule shall take effect as otherwise provided by law after submission to Congress under paragraph (1).

(5) Notwithstanding paragraph (3), the effective date of a rule shall not be delayed by oper-

ducing the need for corrective action at a future date;

(6) minimizing the generation of hazardous waste and the land disposal of hazardous waste by encouraging process substitution, materials recovery, properly conducted recycling and reuse, and treatment;

(7) establishing a viable Federal-State partnership to carry out the purposes of this chapter and insuring that the Administrator will, in carrying out the provisions of subchapter III of this chapter, give a high priority to assisting and cooperating with States in obtaining full authorization of State programs under subchapter III of this chapter;

(8) providing for the promulgation of guidelines for solid waste collection, transport, separation, recovery, and disposal practices and systems;

(9) promoting a national research and development program for improved solid waste management and resource conservation techniques, more effective organizational arrangements, and new and improved methods of collection, separation, and recovery, and recycling of solid wastes and environmentally safe disposal of nonrecoverable residues;

(10) promoting the demonstration, construction, and application of solid waste management, resource recovery, and resource conservation systems which preserve and enhance the quality of air, water, and land resources; and

(11) establishing a cooperative effort among the Federal, State, and local governments and private enterprise in order to recover valuable materials and energy from solid waste.

(b) National policy

The Congress hereby declares it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment.

(Pub. L. 89–272, title II, § 1003, as added Pub. L. 94–580, § 2, Oct. 21, 1976, 90 Stat. 2798; amended Pub. L. 98–616, title I, § 101(b), Nov. 8, 1984, 98 Stat. 3224.)

PRIOR PROVISIONS

Provisions similar to those in this section were contained in section 3251 of this title, prior to the general amendment of the Solid Waste Disposal Act by Pub. L. 94–580.

AMENDMENTS

1984—Subsec. (a). Pub. L. 98–616, § 101(b)(1), designated existing provisions as subsec. (a).

Subsec. (a)(4) to (11). Pub. L. 98–616, § 101(b)(2), struck out par. (4) which provided for regulating the treatment, storage, transportation, and disposal of hazardous wastes which have adverse effects on health and the environment, added pars. (4) to (7), and redesignated former pars. (5) to (8) as (8) to (11), respectively.

Subsec. (b). Pub. L. 98–616, § 101(b)(1), added subsec. (b).

§ 6903. Definitions

As used in this chapter:

(1) The term "Administrator" means the Administrator of the Environmental Protection Agency.

(2) The term "construction," with respect to any project of construction under this chapter, means (A) the erection or building of new structures and acquisition of lands or interests therein, or the acquisition, replacement, expansion, remodeling, alteration, modernization, or extension of existing structures, and (B) the acquisition and installation of initial equipment of, or required in connection with, new or newly acquired structures or the expanded, remodeled, altered, modernized or extended part of existing structures (including trucks and other motor vehicles, and tractors, cranes, and other machinery) necessary for the proper utilization and operation of the facility after completion of the project; and includes preliminary planning to determine the economic and engineering feasibility and the public health and safety aspects of the project, the engineering, architectural, legal, fiscal, and economic investigations and studies, and any surveys, designs, plans, working drawings, specifications, and other action necessary for the carrying out of the project, and (C) the inspection and supervision of the process of carrying out the project to completion.

(2A) The term "demonstration" means the initial exhibition of a new technology process or practice or a significantly new combination or use of technologies, processes or practices, subsequent to the development stage, for the purpose of proving technological feasibility and cost effectiveness.

(3) The term "disposal" means the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.

(4) The term "Federal agency" means any department, agency, or other instrumentality of the Federal Government, any independent agency or establishment of the Federal Government including any Government corporation, and the Government Printing Office.

(5) The term "hazardous waste" means a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may—

(A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or

(B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

(6) The term "hazardous waste generation" means the act or process of producing hazardous waste.

(7) The term "hazardous waste management" means the systematic control of the collection, source separation, storage, transportation, processing, treatment, recovery, and disposal of hazardous wastes.

(8) For purposes of Federal financial assistance (other than rural communities assistance), the term "implementation" does not include the acquisition, leasing, construction, or modification of facilities or equipment or the acquisition, leasing, or improvement of land.

(9) The term "intermunicipal agency" means an agency established by two or more municipalities with responsibility for planning or administration of solid waste.

(10) The term "interstate agency" means an agency of two or more municipalities in different States, or an agency established by two or more States, with authority to provide for the management of solid wastes and serving two or more municipalities located in different States.

(11) The term "long-term contract" means, when used in relation to solid waste supply, a contract of sufficient duration to assure the viability of a resource recovery facility (to the extent that such viability depends upon solid waste supply).

(12) The term "manifest" means the form used for identifying the quantity, composition, and the origin, routing, and destination of hazardous waste during its transportation from the point of generation to the point of disposal, treatment, or storage.

(13) The term "municipality" (A) means a city, town, borough, county, parish, district, or other public body created by or pursuant to State law, with responsibility for the planning or administration of solid waste management, or an Indian tribe or authorized tribal organization or Alaska Native village or organization, and (B) includes any rural community or unincorporated town or village or any other public entity for which an application for assistance is made by a State or political subdivision thereof.

(14) The term "open dump" means any facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under section 6944 of this title and which is not a facility for disposal of hazardous waste.

(15) The term "person" means an individual, trust, firm, joint stock company, corporation (including a government corporation), partnership, association, State, municipality, commission, political subdivision of a State, or any interstate body and shall include each department, agency, and instrumentality of the United States.

(16) The term "procurement item" means any device, good, substance, material, product, or other item whether real or personal property which is the subject of any purchase, barter, or other exchange made to procure such item.

(17) The term "procuring agency" means any Federal agency, or any State agency or agency of a political subdivision of a State which is using appropriated Federal funds for such procurement, or any person contracting with any such agency with respect to work performed under such contract.

(18) The term "recoverable" refers to the capability and likelihood of being recovered from solid waste for a commercial or industrial use.

(19) The term "recovered material" means waste material and byproducts which have been recovered or diverted from solid waste, but such term does not include those materials and byproducts generated from, and commonly reused within, an original manufacturing process.

(20) The term "recovered resources" means material or energy recovered from solid waste.

(21) The term "resource conservation" means reduction of the amounts of solid waste that are generated, reduction of overall resource consumption, and utilization of recovered resources.

(22) The term "resource recovery" means the recovery of material or energy from solid waste.

(23) The term "resource recovery system" means a solid waste management system which provides for collection, separation, recycling, and recovery of solid wastes, including disposal of nonrecoverable waste residues.

(24) The term "resource recovery facility" means any facility at which solid waste is processed for the purpose of extracting, converting to energy, or otherwise separating and preparing solid waste for reuse.

(25) The term "regional authority" means the authority established or designated under section 6946 of this title.

(26) The term "sanitary landfill" means a facility for the disposal of solid waste which meets the criteria published under section 6944 of this title.

(26A) The term "sludge" means any solid, semisolid or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effects.

(27) The term "solid waste" means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 1342 of title 33, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923) [42 U.S.C. 2011 et seq.].

(28) The term "solid waste management" means the systematic administration of activities which provide for the collection, source separation, storage, transportation, transfer, processing, treatment, and disposal of solid waste.

(29) The term "solid waste management facility" includes—

(A) any resource recovery system or component thereof,

(B) any system, program, or facility for resource conservation, and

(C) any facility for the collection, source separation, storage, transportation, transfer, processing, treatment or disposal of solid wastes, including hazardous wastes, whether such facility is associated with facilities generating such wastes or otherwise.

(30) The terms "solid waste planning", "solid waste management", and "comprehensive plan-

ning" include planning or management respecting resource recovery and resource conservation.

(31) The term "State" means any of the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

(32) The term "State authority" means the agency established or designated under section 6947 of this title.

(33) The term "storage", when used in connection with hazardous waste, means the containment of hazardous waste, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazardous waste.

(34) The term "treatment", when used in connection with hazardous waste, means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste or so as to render such waste nonhazardous, safer for transport, amenable for recovery, amenable for storage, or reduced in volume. Such term includes any activity or processing designed to change the physical form or chemical composition of hazardous waste so as to render it nonhazardous.

(35) The term "virgin material" means a raw material, including previously unused copper, aluminum, lead, zinc, iron, or other metal or metal ore, any undeveloped resource that is, or with new technology will become, a source of raw materials.

(36) The term "used oil" means any oil which has been—

(A) refined from crude oil,

(B) used, and

(C) as a result of such use, contaminated by physical or chemical impurities.

(37) The term "recycled oil" means any used oil which is reused, following its original use, for any purpose (including the purpose for which the oil was originally used). Such term includes oil which is re-refined, reclaimed, burned, or reprocessed.

(38) The term "lubricating oil" means the fraction of crude oil which is sold for purposes of reducing friction in any industrial or mechanical device. Such term includes re-refined oil.

(39) The term "re-refined oil" means used oil from which the physical and chemical contaminants acquired through previous use have been removed through a refining process.

(40) Except as otherwise provided in this paragraph, the term "medical waste" means any solid waste which is generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals. Such term does not include any hazardous waste identified or listed under subchapter III of this chapter or any household waste as defined in regulations under subchapter III of this chapter.

(41) The term "mixed waste" means waste that contains both hazardous waste and source, special nuclear, or by-product material subject to the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.).

(Pub. L. 89-272, title II, §1004, as added Pub. L. 94-580, §2, Oct. 21, 1976, 90 Stat. 2798; amended Pub. L. 95-609, §7(b), Nov. 8, 1978, 92 Stat. 3081; Pub. L. 96-463, §3, Oct. 15, 1980, 94 Stat. 2055; Pub. L. 96-482, §2, Oct. 21, 1980, 94 Stat. 2334; Pub. L. 100-582, §3, Nov. 1, 1988, 102 Stat. 2958; Pub. L. 102-386, title I, §§103, 105(b), Oct. 6, 1992, 106 Stat. 1507, 1512.)

REFERENCES IN TEXT

The Atomic Energy Act of 1954, referred to in pars. (27) and (41), is act Aug. 1, 1946, ch. 724, as added by act Aug. 30, 1954, ch. 1073, §1, 68 Stat. 921, and amended, which is classified generally to chapter 23 (§2011 et seq.) of this title. For complete classification of this Act to the Code, see Short Title note set out under section 2011 of this title and Tables.

PRIOR PROVISIONS

Provisions similar to those in this section were contained in section 3252 of this title, prior to the general amendment of the Solid Waste Disposal Act by Pub. L. 94-580.

AMENDMENTS

1992—Par. (15). Pub. L. 102-386, §103, inserted before period at end "and shall include each department, agency, and instrumentality of the United States".

Par. (41). Pub. L. 102-386, §105(b), added par. (41).

1988—Par. (40). Pub. L. 100-582 added par. (40).

1980—Par. (14). Pub. L. 96-482, §2(a), defined "open dump" to include a facility, substituted requirement that disposal facility or site not be a sanitary landfill meeting section 6944 of this title criteria for prior requirement that disposal site not be a sanitary landfill within meaning of section 6944 of this title, and required that the disposal facility or site not be a facility for disposal of hazardous waste.

Par. (19). Pub. L. 96-482, §2(b), defined "recovered material" to cover byproducts, substituted provision for recovery or diversion of waste material and byproducts from solid waste for prior provision for collection or recovery of material from solid waste, and excluded materials and byproducts generated from and commonly reused within an original manufacturing process.

Pars. (36) to (39). Pub. L. 96-463, §3, added pars. (36) to (39).

1978—Par. (8). Pub. L. 95-609, §7(b)(1), struck out provision stating that employees' salaries due pursuant to subchapter IV of this chapter would not be included after Dec. 31, 1979.

Par. (10). Pub. L. 95-609, §7(b)(2), substituted "management" for "disposal".

Par. (29)(C). Pub. L. 95-609, §7(b)(3), substituted "the collection, source separation, storage, transportation, transfer, processing, treatment or disposal" for "the treatment".

TRANSFER OF FUNCTIONS

Enforcement functions of Administrator or other official of Environmental Protection Agency related to compliance with resource conservation and recovery permits used under this chapter with respect to preconstruction, construction, and initial operation of transportation system for Canadian and Alaskan natural gas transferred to Federal Inspector, Office of Federal Inspector for the Alaska Natural Gas Transportation System, until first anniversary of date of initial operation of Alaska Natural Gas Transportation System, see Reorg. Plan No. 1 of 1979, eff. July 1, 1979, §§102(a), 203(a), 44 F.R. 33663, 33666, 93 Stat. 1373, 1376, set out in the Appendix to Title 5, Government Organization and Employees. Office of Federal Inspector for the Alaska Natural Gas Transportation System abolished and functions and authority vested in Inspector transferred to Secretary of Energy by section 3012(b) of Pub. L. 102-486, set out as an Abolition of Office of Federal Inspector note under section 719e of Title 15, Com-

§ 6912. Authorities of Administrator

(a) Authorities

In carrying out this chapter, the Administrator is authorized to—

(1) prescribe, in consultation with Federal, State, and regional authorities, such regulations as are necessary to carry out his functions under this chapter;

(2) consult with or exchange information with other Federal agencies undertaking research, development, demonstration projects, studies, or investigations relating to solid waste;

(3) provide technical and financial assistance to States or regional agencies in the development and implementation of solid waste plans and hazardous waste management programs;

(4) consult with representatives of science, industry, agriculture, labor, environmental protection and consumer organizations, and other groups, as he deems advisable;

(5) utilize the information, facilities, personnel and other resources of Federal agencies, including the National Institute of Standards and Technology and the National Bureau of the Census, on a reimbursable basis, to perform research and analyses and conduct studies and investigations related to resource recovery and conservation and to otherwise carry out the Administrator's functions under this chapter; and

(6) to delegate to the Secretary of Transportation the performance of any inspection or enforcement function under this chapter relating to the transportation of hazardous waste where such delegation would avoid unnecessary duplication of activity and would carry out the objectives of this chapter and of chapter 51 of title 49.

(b) Revision of regulations

Each regulation promulgated under this chapter shall be reviewed and, where necessary, revised not less frequently than every three years.

(c) Criminal investigations

In carrying out the provisions of this chapter, the Administrator, and duly-designated agents and employees of the Environmental Protection Agency, are authorized to initiate and conduct investigations under the criminal provisions of this chapter, and to refer the results of these investigations to the Attorney General for prosecution in appropriate cases.

(Pub. L. 89–272, title II, §2002, as added Pub. L. 94–580, §2, Oct. 21, 1976, 90 Stat. 2804; amended Pub. L. 96–482, §5, Oct. 21, 1980, 94 Stat. 2335; Pub. L. 98–616, title IV, §403(d)(4), Nov. 8, 1984, 98 Stat. 3272; Pub. L. 100–418, title V, §5115(c), Aug. 23, 1988, 102 Stat. 1433.)

CODIFICATION

In subsec. (a)(6), "chapter 51 of title 49" substituted for "the Hazardous Materials Transportation Act [49 App. U.S.C. 1801 et seq.]" on authority of Pub. L. 103–272, §6(b), July 5, 1994, 108 Stat. 1378, the first section of which enacted subtitles II, III, and V to X of Title 49, Transportation.

AMENDMENTS

1988—Subsec. (a)(5). Pub. L. 100–418 substituted "National Institute of Standards and Technology" for "National Bureau of Standards".

1984—Subsec. (c). Pub. L. 98–616 added subsec. (c).

1980—Subsec. (a)(6). Pub. L. 96–482 added par. (6).

TRANSFER OF FUNCTIONS

For transfer of certain enforcement functions of Administrator or other official of Environmental Protection Agency under this chapter to Federal Inspector, Office of Federal Inspector for the Alaska Natural Gas Transportation System, and subsequent transfer to Secretary of Energy, then to Federal Coordinator for Alaska Natural Gas Transportation Projects, see note set out under section 6903 of this title.

§ 6913. Resource Recovery and Conservation Panels

The Administrator shall provide teams of personnel, including Federal, State, and local employees or contractors (hereinafter referred to as "Resource Conservation and Recovery Panels") to provide Federal agencies, States and local governments upon request with technical assistance on solid waste management, resource recovery, and resource conservation. Such teams shall include technical, marketing, financial, and institutional specialists, and the services of such teams shall be provided without charge to States or local governments.

(Pub. L. 89–272, title II, §2003, as added Pub. L. 94–580, §2, Oct. 21, 1976, 90 Stat. 2804; amended Pub. L. 95–609, §7(e), Nov. 8, 1978, 92 Stat. 3081.)

AMENDMENTS

1978—Pub. L. 95–609 inserted "Federal agencies," after "to provide".

TRANSFER OF FUNCTIONS

For transfer of certain enforcement functions of Administrator or other official of Environmental Protection Agency under this chapter to Federal Inspector, Office of Federal Inspector for the Alaska Natural Gas Transportation System, and subsequent transfer to Secretary of Energy, then to Federal Coordinator for Alaska Natural Gas Transportation Projects, see note set out under section 6903 of this title.

§ 6914. Grants for discarded tire disposal

(a) Grants

The Administrator shall make available grants equal to 5 percent of the purchase price of tire shredders (including portable shredders attached to tire collection trucks) to those eligible applicants best meeting criteria promulgated under this section. An eligible applicant may be any private purchaser, public body, or public-private joint venture. Criteria for receiving grants shall be promulgated under this section and shall include the policy to offer any private purchaser the first option to receive a grant, the policy to develop widespread geographic distribution of tire shredding facilities, the need for such facilities within a geographic area, and the projected risk and viability of any such venture. In the case of an application under this section from a public body, the Administrator shall first make a determination that there are no private purchasers interested in making an application before approving a grant to a public body.

(b) Authorization of appropriations

There is authorized to be appropriated $750,000 for each of the fiscal years 1978 and 1979 to carry out this section.

TRANSFER OF FUNCTIONS

For transfer of certain enforcement functions of Administrator or other official of Environmental Protection Agency under this chapter to Federal Inspector, Office of Federal Inspector for the Alaska Natural Gas Transportation System, and subsequent transfer to Secretary of Energy, then to Federal Coordinator for Alaska Natural Gas Transportation Projects, see note set out under section 6903 of this title.

§ 6972. Citizen suits

(a) In general

Except as provided in subsection (b) or (c) of this section, any person may commence a civil action on his own behalf—

(1)(A) against any person (including (a) the United States, and (b) any other governmental instrumentality or agency, to the extent permitted by the eleventh amendment to the Constitution) who is alleged to be in violation of any permit, standard, regulation, condition, requirement, prohibition, or order which has become effective pursuant to this chapter; or

(B) against any person, including the United States and any other governmental instrumentality or agency, to the extent permitted by the eleventh amendment to the Constitution, and including any past or present generator, past or present transporter, or past or present owner or operator of a treatment, storage, or disposal facility, who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment; or

(2) against the Administrator where there is alleged a failure of the Administrator to perform any act or duty under this chapter which is not discretionary with the Administrator.

Any action under paragraph (a)(1) of this subsection shall be brought in the district court for the district in which the alleged violation occurred or the alleged endangerment may occur. Any action brought under paragraph (a)(2) of this subsection may be brought in the district court for the district in which the alleged violation occurred or in the District Court of the District of Columbia. The district court shall have jurisdiction, without regard to the amount in controversy or the citizenship of the parties, to enforce the permit, standard, regulation, condition, requirement, prohibition, or order, referred to in paragraph (1)(A), to restrain any person who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste referred to in paragraph (1)(B), to order such person to take such other action as may be necessary, or both, or to order the Administrator to perform the act or duty referred to in paragraph (2), as the case may be, and to apply any appropriate civil penalties under section 6928(a) and (g) of this title.

(b) Actions prohibited

(1) No action may be commenced under subsection (a)(1)(A) of this section—

(A) prior to 60 days after the plaintiff has given notice of the violation to—

(i) the Administrator;

(ii) the State in which the alleged violation occurs; and

(iii) to any alleged violator of such permit, standard, regulation, condition, requirement, prohibition, or order,

except that such action may be brought immediately after such notification in the case of an action under this section respecting a violation of subchapter III of this chapter; or

(B) if the Administrator or State has commenced and is diligently prosecuting a civil or criminal action in a court of the United States or a State to require compliance with such permit, standard, regulation, condition, requirement, prohibition, or order.

In any action under subsection (a)(1)(A) of this section in a court of the United States, any person may intervene as a matter of right.

(2)(A) No action may be commenced under subsection (a)(1)(B) of this section prior to ninety days after the plaintiff has given notice of the endangerment to—

(i) the Administrator;

(ii) the State in which the alleged endangerment may occur;

(iii) any person alleged to have contributed or to be contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste referred to in subsection (a)(1)(B) of this section,

except that such action may be brought immediately after such notification in the case of an action under this section respecting a violation of subchapter III of this chapter.

(B) No action may be commenced under subsection (a)(1)(B) of this section if the Administrator, in order to restrain or abate acts or conditions which may have contributed or are contributing to the activities which may present the alleged endangerment—

(i) has commenced and is diligently prosecuting an action under section 6973 of this title or under section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 [42 U.S.C. 9606],[1]

(ii) is actually engaging in a removal action under section 104 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 [42 U.S.C. 9604];

(iii) has incurred costs to initiate a Remedial Investigation and Feasibility Study under section 104 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 [42 U.S.C. 9604] and is diligently proceeding with a remedial action under that Act [42 U.S.C. 9601 et seq.]; or

(iv) has obtained a court order (including a consent decree) or issued an administrative order under section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 980[2] [42 U.S.C. 9606] or section 6973 of this title pursuant to which a responsible party is diligently conducting a removal action, Remedial Investigation and Feasibility

[1] So in original. The comma probably should be a semicolon.

[2] So in original. Probably should be "1980".

Study (RIFS), or proceeding with a remedial action.

In the case of an administrative order referred to in clause (iv), actions under subsection (a)(1)(B) of this section are prohibited only as to the scope and duration of the administrative order referred to in clause (iv).

(C) No action may be commenced under subsection (a)(1)(B) of this section if the State, in order to restrain or abate acts or conditions which may have contributed or are contributing to the activities which may present the alleged endangerment—

(i) has commenced and is diligently prosecuting an action under subsection (a)(1)(B) of this section;

(ii) is actually engaging in a removal action under section 104 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 [42 U.S.C. 9604]; or

(iii) has incurred costs to initiate a Remedial Investigation and Feasibility Study under section 104 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 [42 U.S.C. 9604] and is diligently proceeding with a remedial action under that Act [42 U.S.C. 9601 et seq.].

(D) No action may be commenced under subsection (a)(1)(B) of this section by any person (other than a State or local government) with respect to the siting of a hazardous waste treatment, storage, or a disposal facility, nor to restrain or enjoin the issuance of a permit for such facility.

(E) In any action under subsection (a)(1)(B) of this section in a court of the United States, any person may intervene as a matter of right when the applicant claims an interest relating to the subject of the action and he is so situated that the disposition of the action may, as a practical matter, impair or impede his ability to protect that interest, unless the Administrator or the State shows that the applicant's interest is adequately represented by existing parties.

(F) Whenever any action is brought under subsection (a)(1)(B) of this section in a court of the United States, the plaintiff shall serve a copy of the complaint on the Attorney General of the United States and with the Administrator.

(c) Notice

No action may be commenced under paragraph (a)(2) of this section prior to sixty days after the plaintiff has given notice to the Administrator that he will commence such action, except that such action may be brought immediately after such notification in the case of an action under this section respecting a violation of subchapter III of this chapter. Notice under this subsection shall be given in such manner as the Administrator shall prescribe by regulation. Any action respecting a violation under this chapter may be brought under this section only in the judicial district in which such alleged violation occurs.

(d) Intervention

In any action under this section the Administrator, if not a party, may intervene as a matter of right.

(e) Costs

The court, in issuing any final order in any action brought pursuant to this section or section 6976 of this title, may award costs of litigation (including reasonable attorney and expert witness fees) to the prevailing or substantially prevailing party, whenever the court determines such an award is appropriate. The court may, if a temporary restraining order or preliminary injunction is sought, require the filing of a bond or equivalent security in accordance with the Federal Rules of Civil Procedure.

(f) Other rights preserved

Nothing in this section shall restrict any right which any person (or class of persons) may have under any statute or common law to seek enforcement of any standard or requirement relating to the management of solid waste or hazardous waste, or to seek any other relief (including relief against the Administrator or a State agency).

(g) Transporters

A transporter shall not be deemed to have contributed or to be contributing to the handling, storage, treatment, or disposal, referred to in subsection (a)(1)(B) of this section taking place after such solid waste or hazardous waste has left the possession or control of such transporter, if the transportation of such waste was under a sole contractual arrangement arising from a published tariff and acceptance for carriage by common carrier by rail and such transporter has exercised due care in the past or present handling, storage, treatment, transportation and disposal of such waste.

(Pub. L. 89–272, title II, § 7002, as added Pub. L. 94–580, § 2, Oct. 21, 1976, 90 Stat. 2825; amended Pub. L. 95–609, § 7(p), Nov. 8, 1978, 92 Stat. 3083; Pub. L. 98–616, title IV, § 401, Nov. 8, 1984, 98 Stat. 3268.)

REFERENCES IN TEXT

That Act, referred to in subsec. (b)(2)(B)(iii), (C)(iii), means Pub. L. 96–510, Dec. 11, 1980, 94 Stat. 2767, as amended, known as the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, which is classified principally to chapter 103 (§ 9601 et seq.) of this title. For complete classification of this Act to the Code, see Short Title note set out under section 9601 of this title and Tables.

The Federal Rules of Civil Procedure, referred to in subsec. (e), are set out in the Appendix to Title 28, Judiciary and Judicial Procedure.

AMENDMENTS

1984—Subsec. (a). Pub. L. 98–616, § 401(a), (b), designated existing provisions of subsec. (a)(1) as subpar. (A) thereof, inserted "prohibition," after "requirement,", added subpar. (B), and in provisions following par. (2) inserted "or the alleged endangerment may occur" in first sentence and substituted "to enforce the permit, standard, regulation, condition, requirement, prohibition, or order, referred to in paragraph (1)(A), to restrain any person who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste referred to in paragraph (1)(B), to order such person to take such other action as may be necessary, or both, or to order the Administrator to perform the act or duty referred to in paragraph (2), as the case may be, and to apply any appropriate civil penalties under section 6928(a) and (g) of this title" for "to enforce such regulation or order, or to order the Administrator to perform such act or duty as the case may be".

Subsec. (b). Pub. L. 98–616, § 401(d), amended subsec. (b) generally. Prior to amendment, subsec. (b) read as

follows: "No action may be commenced under paragraph (a)(1) of this section—

"(1) prior to sixty days after the plaintiff has given notice of the violation (A) to the Administrator; (B) to the State in which the alleged violation occurs; and (C) to any alleged violator of such permit, standard, regulation, condition, requirement, or order; or

"(2) if the Administrator or State has commenced and is diligently prosecuting a civil or criminal action in a court of the United States or a State to require compliance with such permit, standard, regulation, condition, requirement, or order: *Provided, however*, That in any such action in a court of the United States, any person may intervene as a matter of right."

Subsec. (e). Pub. L. 98–616, §401(e), substituted "to the prevailing or substantially prevailing party" for "to any party" and inserted "or section 6976 of this title".

Subsec. (g). Pub. L. 98–616, §401(c), added subsec. (g).

1978—Subsec. (c). Pub. L. 95–609, §7(p)(1), substituted "subchapter III of this chapter" for "section 212 of this Act."

Subsec. (e). Pub. L. 95–609, §7(p)(2), substituted "require" for "requiring".

TRANSFER OF FUNCTIONS

For transfer of certain enforcement functions of Administrator or other official of Environmental Protection Agency under this chapter to Federal Inspector, Office of Federal Inspector for the Alaska Natural Gas Transportation System, and subsequent transfer to Secretary of Energy, then to Federal Coordinator for Alaska Natural Gas Transportation Projects, see note set out under section 6903 of this title.

§ 6973. Imminent hazard

(a) Authority of Administrator

Notwithstanding any other provision of this chapter, upon receipt of evidence that the past or present handling, storage, treatment, transportation or disposal of any solid waste or hazardous waste may present an imminent and substantial endangerment to health or the environment, the Administrator may bring suit on behalf of the United States in the appropriate district court against any person (including any past or present generator, past or present transporter, or past or present owner or operator of a treatment, storage, or disposal facility) who has contributed or who is contributing to such handling, storage, treatment, transportation or disposal to restrain such person from such handling, storage, treatment, transportation, or disposal, to order such person to take such other action as may be necessary, or both. A transporter shall not be deemed to have contributed or to be contributing to such handling, storage, treatment, or disposal taking place after such solid waste or hazardous waste has left the possession or control of such transporter if the transportation of such waste was under a sole contractural[1] arrangement arising from a published tariff and acceptance for carriage by common carrier by rail and such transporter has exercised due care in the past or present handling, storage, treatment, transportation and disposal of such waste. The Administrator shall provide notice to the affected State of any such suit. The Administrator may also, after notice to the affected State, take other action under this section including, but not limited to, issuing such orders as may be necessary to protect public health and the environment.

(b) Violations

Any person who willfully violates, or fails or refuses to comply with, any order of the Administrator under subsection (a) of this section may, in an action brought in the appropriate United States district court to enforce such order, be fined not more than $5,000 for each day in which such violation occurs or such failure to comply continues.

(c) Immediate notice

Upon receipt of information that there is hazardous waste at any site which has presented an imminent and substantial endangerment to human health or the environment, the Administrator shall provide immediate notice to the appropriate local government agencies. In addition, the Administrator shall require notice of such endangerment to be promptly posted at the site where the waste is located.

(d) Public participation in settlements

Whenever the United States or the Administrator proposes to covenant not to sue or to forbear from suit or to settle any claim arising under this section, notice, and opportunity for a public meeting in the affected area, and a reasonable opportunity to comment on the proposed settlement prior to its final entry shall be afforded to the public. The decision of the United States or the Administrator to enter into or not to enter into such Consent Decree, covenant or agreement shall not constitute a final agency action subject to judicial review under this chapter or chapter 7 of title 5.

(Pub. L. 89–272, title II, §7003, as added Pub. L. 94–580, §2, Oct. 21, 1976, 90 Stat. 2826; amended Pub. L. 95–609, §7(q), Nov. 8, 1978, 92 Stat. 3083; Pub. L. 96–482, §25, Oct. 21, 1980, 94 Stat. 2348; Pub. L. 98–616, title IV, §§402, 403(a), 404, Nov. 8, 1984, 98 Stat. 3271, 3273.)

CODIFICATION

In subsec. (d), "chapter 7 of title 5" substituted for "the Administrative Procedure Act" on authority of Pub. L. 89–554, §7(b), Sept. 6, 1966, 80 Stat. 631, the first section of which enacted Title 5, Government Organization and Employees.

AMENDMENTS

1984—Subsec. (a). Pub. L. 98–616, §402, inserted "past or present" after "evidence that the", substituted "against any person (including any past or present generator, past or present transporter, or past or present owner or operator of a treatment, storage, or disposal facility) who has contributed or, who is" for "to immediately restrain any person", substituted "to restrain such person from" for "to stop", substituted ", to order such person to take such other action as may be necessary, or both" for "or to take such other action as may be necessary", and inserted "A transporter shall not be deemed to have contributed or to be contributing to such handling, storage, treatment, or disposal, taking place after such solid waste or hazardous waste has left the possession or control of such transporter, if the transportation of such waste was under a sole contractural [sic] arrangement arising from a published tariff and acceptance for carriage by common carrier by rail and such transporter has exercised due care in the past or present handling, storage, treatment, transportation and disposal of such waste."

[1] So in original. Probably should be "contractual".

Subsec. (c). Pub. L. 98–616, §403(a), added subsec. (c).
Subsec. (d). Pub. L. 98–616, §404, added subsec. (d).

1980—Pub. L. 96–482, §25, designated existing provisions as subsec. (a), substituted "may present" for "is presenting" and "such handling, storage, treatment, transportation or disposal" for "the alleged disposal" and authorized other action to be taken by the Administrator after notice including issuance of protective orders relating to public health and the environment, and added subsec. (b).

1978—Pub. L. 95–609 struck out "for" after "restrain any person".

TRANSFER OF FUNCTIONS

For transfer of certain enforcement functions of Administrator or other official of Environmental Protection Agency under this chapter to Federal Inspector, Office of Federal Inspector for the Alaska Natural Gas Transportation System, and subsequent transfer to Secretary of Energy, then to Federal Coordinator for Alaska Natural Gas Transportation Projects, see note set out under section 6903 of this title.

§ 6974. Petition for regulations; public participation

(a) Petition

Any person may petition the Administrator for the promulgation, amendment, or repeal of any regulation under this chapter. Within a reasonable time following receipt of such petition, the Administrator shall take action with respect to such petition and shall publish notice of such action in the Federal Register, together with the reasons therefor.

(b) Public participation

(1) Public participation in the development, revision, implementation, and enforcement of any regulation, guideline, information, or program under this chapter shall be provided for, encouraged, and assisted by the Administrator and the States. The Administrator, in cooperation with the States, shall develop and publish minimum guidelines for public participation in such processes.

(2) Before the issuing of a permit to any person with any respect to any facility for the treatment, storage, or disposal of hazardous wastes under section 6925 of this title, the Administrator shall—

(A) cause to be published in major local newspapers of general circulation and broadcast over local radio stations notice of the agency's intention to issue such permit, and

(B) transmit in writing notice of the agency's intention to issue such permit to each unit of local government having jurisdiction over the area in which such facility is proposed to be located and to each State agency having any authority under State law with respect to the construction or operation of such facility.

If within 45 days the Administrator receives written notice of opposition to the agency's intention to issue such permit and a request for a hearing, or if the Administrator determines on his own initiative, he shall hold an informal public hearing (including an opportunity for presentation of written and oral views) on whether he should issue a permit for the proposed facility. Whenever possible the Administrator shall schedule such hearing at a location convenient to the nearest population center to such proposed facility and give notice in the aforementioned manner of the date, time, and subject matter of such hearing. No State program which provides for the issuance of permits referred to in this paragraph may be authorized by the Administrator under section 6926 of this title unless such program provides for the notice and hearing required by the paragraph.

(Pub. L. 89–272, title II, §7004, as added Pub. L. 94–580, §2, Oct. 21, 1976, 90 Stat. 2826; amended Pub. L. 96–482, §26, Oct. 21, 1980, 94 Stat. 2348.)

AMENDMENTS

1980—Subsec. (b). Pub. L. 96–482 designated existing provisions as par. (1) and added par. (2).

TRANSFER OF FUNCTIONS

For transfer of certain enforcement functions of Administrator or other official of Environmental Protection Agency under this chapter to Federal Inspector, Office of Federal Inspector for the Alaska Natural Gas Transportation System, and subsequent transfer to Secretary of Energy, then to Federal Coordinator for Alaska Natural Gas Transportation Projects, see note set out under section 6903 of this title.

§ 6975. Separability

If any provision of this chapter, or the application of any provision of this chapter to any person or circumstance, is held invalid, the application of such provision to other persons or circumstances, and the remainder of this chapter, shall not be affected thereby.

(Pub. L. 89–272, title II, §7005, as added Pub. L. 94–580, §2, Oct. 21, 1976, 90 Stat. 2827.)

§ 6976. Judicial review

(a) Review of final regulations and certain petitions

Any judicial review of final regulations promulgated pursuant to this chapter and the Administrator's denial of any petition for the promulgation, amendment, or repeal of any regulation under this chapter shall be in accordance with sections 701 through 706 of title 5, except that—

(1) a petition for review of action of the Administrator in promulgating any regulation, or requirement under this chapter or denying any petition for the promulgation, amendment or repeal of any regulation under this chapter may be filed only in the United States Court of Appeals for the District of Columbia, and such petition shall be filed within ninety days from the date of such promulgation or denial, or after such date if such petition for review is based solely on grounds arising after such ninetieth day; action of the Administrator with respect to which review could have been obtained under this subsection shall not be subject to judicial review in civil or criminal proceedings for enforcement; and

(2) in any judicial proceeding brought under this section in which review is sought of a determination under this chapter required to be made on the record after notice and opportunity for hearing, if a party seeking review under this chapter applies to the court for leave to adduce additional evidence, and shows

to the satisfaction of the court that the information is material and that there were reasonable grounds for the failure to adduce such evidence in the proceeding before the Administrator, the court may order such additional evidence (and evidence in rebuttal thereof) to be taken before the Administrator, and to be adduced upon the hearing in such manner and upon such terms and conditions as the court may deem proper; the Administrator may modify his findings as to the facts, or make new findings, by reason of the additional evidence so taken, and he shall file with the court such modified or new findings and his recommendation, if any, for the modification or setting aside of his original order, with the return of such additional evidence.

(b) Review of certain actions under sections 6925 and 6926 of this title

Review of the Administrator's action (1) in issuing, denying, modifying, or revoking any permit under section 6925 of this title (or in modifying or revoking any permit which is deemed to have been issued under section 6935(d)(1)[1] of this title), or (2) in granting, denying, or withdrawing authorization or interim authorization under section 6926 of this title, may be had by any interested person in the Circuit Court of Appeals of the United States for the Federal judicial district in which such person resides or transacts such business upon application by such person. Any such application shall be made within ninety days from the date of such issuance, denial, modification, revocation, grant, or withdrawal, or after such date only if such application is based solely on grounds which arose after such ninetieth day. Action of the Administrator with respect to which review could have been obtained under this subsection shall not be subject to judicial review in civil or criminal proceedings for enforcement. Such review shall be in accordance with sections 701 through 706 of title 5.

(Pub. L. 89–272, title II, §7006, as added Pub. L. 94–580, §2, Oct. 21, 1976, 90 Stat. 2827; amended Pub. L. 96–482, §27, Oct. 21, 1980, 94 Stat. 2349; Pub. L. 98–616, title II, §241(b)(1), title IV, §403(d)(5), Nov. 8, 1984, 98 Stat. 3259, 3273.)

REFERENCES IN TEXT

Section 6935(d)(1) of this title, referred to in subsec. (b), was in the original a reference to section 3012(d)(1) of Pub. L. 89–272, which was renumbered section 3014(d)(1) of Pub. L. 89–272 by Pub. L. 98–616 and is classified to section 6935(d)(1) of this title.

AMENDMENTS

1984—Pub. L. 98–616 inserted "(or in modifying or revoking any permit which is deemed to have been issued under section 6935(d)(1) of this title)" and inserted "Action of the Administrator with respect to which review could have been obtained under this subsection shall not be subject to judicial review in civil or criminal proceedings for enforcement."

1980—Pub. L. 96–482, §27(a), designated existing provisions as subsec. (a), in provision preceding par. (1), included judicial review of Administrator's denial of any petition for promulgation, amendment, or repeal of any regulation in par. (1), included review of Administrator's denial of any petition for promulgation, amendment, or repeal of any regulation, and substituted "District of Columbia, and" for "District of Columbia. Any", "date of such promulgation or denial" for "date of such promulgation", "petition for review is based" for "petition is based", and "; action" for ". Action", and in par. (2), substituted "proper; the" for "proper. The", and added subsec. (b).

TRANSFER OF FUNCTIONS

For transfer of certain enforcement functions of Administrator or other official of Environmental Protection Agency under this chapter to Federal Inspector, Office of Federal Inspector for the Alaska Natural Gas Transportation System, and subsequent transfer to Secretary of Energy, then to Federal Coordinator for Alaska Natural Gas Transportation Projects, see note set out under section 6903 of this title.

§ 6977. Grants or contracts for training projects

(a) General authority

The Administrator is authorized to make grants to, and contracts with any eligible organization. For purposes of this section the term "eligible organization" means a State or interstate agency, a municipality, educational institution, and any other organization which is capable of effectively carrying out a project which may be funded by grant under subsection (b) of this section.

(b) Purposes

(1) Subject to the provisions of paragraph (2), grants or contracts may be made to pay all or a part of the costs, as may be determined by the Administrator, of any project operated or to be operated by an eligible organization, which is designed—

(A) to develop, expand, or carry out a program (which may combine training, education, and employment) for training persons for occupations involving the management, supervision, design, operation, or maintenance of solid waste management and resource recovery equipment and facilities; or

(B) to train instructors and supervisory personnel to train or supervise persons in occupations involving the design, operation, and maintenance of solid waste management and resource recovery equipment and facilities.

(2) A grant or contract authorized by paragraph (1) of this subsection may be made only upon application to the Administrator at such time or times and containing such information as he may prescribe, except that no such application shall be approved unless it provides for the same procedures and reports (and access to such reports and to other records) as required by section 3254a(b)(4) and (5)[1] of this title (as in effect before October 21, 1976) with respect to applications made under such section (as in effect before October 21, 1976).

(Pub. L. 89–272, title II, §7007, as added Pub. L. 94–580, §2, Oct. 21, 1976, 90 Stat. 2827; amended Pub. L. 95–609, §7(r), Nov. 8, 1978, 92 Stat. 3083; Pub. L. 105–362, title V, §501(f), Nov. 10, 1998, 112 Stat. 3284.)

REFERENCES IN TEXT

Section 3254a(b)(4) and (5) of this title, referred to in subsec. (b)(2), was in the original "section 207(b)(4) and

[1] See References in Text note below.

[1] See References in Text note below.

USDW means "underground source of drinking water."

Well means: A bored, drilled, or driven shaft whose depth is greater than the largest surface dimension; or, a dug hole whose depth is greater than the largest surface dimension; or, an improved sinkhole; or, a subsurface fluid distribution system.

Well injection means the subsurface emplacement of fluids through a well.

Well plug means a watertight and gastight seal installed in a borehole or well to prevent movement of fluids.

Well stimulation means several processes used to clean the well bore, enlarge channels, and increase pore space in the interval to be injected thus making it possible for wastewater to move more readily into the formation, and includes (1) surging, (2) jetting, (3) blasting, (4) acidizing, (5) hydraulic fracturing.

Well monitoring means the measurement, by on-site instruments or laboratory methods, of the quality of water in a well.

(Clean Water Act, Safe Drinking Water Act, Clean Air Act, Resource Conservation and Recovery Act: 42 U.S.C. 6905, 6912, 6925, 6927, 6974)

[45 FR 42500, June 24, 1980, as amended at 46 FR 43161, Aug. 27, 1981; 47 FR 4998, Feb. 3, 1982; 48 FR 14293, Apr. 1, 1983; 53 FR 37414, Sept. 26, 1988; 64 FR 68573, Dec. 7, 1999]

§ 146.4 Criteria for exempted aquifers.

An aquifer or a portion thereof which meets the criteria for an "underground source of drinking water" in § 146.3 may be determined under § 144.7 of this chapter to be an "exempted aquifer" for Class I–V wells if it meets the criteria in paragraphs (a) through (c) of this section. Class VI wells must meet the criteria under paragraph (d) of this section:

(a) It does not currently serve as a source of drinking water; and

(b) It cannot now and will not in the future serve as a source of drinking water because:

(1) It is mineral, hydrocarbon or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible.

(2) It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical;

(3) It is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption; or

(4) It is located over a Class III well mining area subject to subsidence or catastrophic collapse; or

(c) The total dissolved solids content of the ground water is more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water system.

(d) The areal extent of an aquifer exemption for a Class II enhanced oil recovery or enhanced gas recovery well may be expanded for the exclusive purpose of Class VI injection for geologic sequestration under § 144.7(d) of this chapter if it meets the following criteria:

(1) It does not currently serve as a source of drinking water; and

(2) The total dissolved solids content of the ground water is more than 3,000 mg/l and less than 10,000 mg/l; and

(3) It is not reasonably expected to supply a public water system.

(Clean Water Act, Safe Drinking Water Act, Clean Air Act, Resource Conservation and Recovery Act: 42 U.S.C. 6905, 6912, 6925, 6927, 6974)

[45 FR 42500, June 24, 1980, as amended at 47 FR 4998, Feb. 3, 1982; 48 FR 14293, Apr. 1, 1983; 75 FR 77291, Dec. 10, 2010]

§ 146.5 Classification of injection wells.

Injection wells are classified as follows:

(a) *Class I.* (1) Wells used by generators of hazardous waste or owners or operators of hazardous waste management facilities to inject hazardous waste beneath the lowermost formation containing, within one quarter (¼) mile of the well bore, an underground source of drinking water.

(2) Other industrial and municipal disposal wells which inject fluids beneath the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water.

(3) Radioactive waste disposal wells which inject fluids below the lowermost formation containing an underground source of drinking water within one quarter mile of the well bore.

(b) *Class II.* Wells which inject fluids:

(1) Which are brought to the surface in connection with conventional oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection.

(2) For enhanced recovery of oil or natural gas; and

(3) For storage of hydrocarbons which are liquid at standard temperature and pressure.

(c) *Class III.* Wells which inject for extraction of minerals including:

(1) Mining of sulfur by the Frasch process;

(2) In situ production of uranium or other metals. This category includes only in-situ production from ore bodies which have not been conventionally mined. Solution mining of conventional mines such as stopes leaching is included in Class V.

(3) Solution mining of salts or potash.

(d) *Class IV.* (1) Wells used by generators of hazardous waste or of radioactive waste, by owners or operators of hazardous waste management facilities, or by owners or operators of radioactive waste disposal sites to dispose of hazardous waste or radioactive waste into a formation which within one quarter (¼) mile of the well contains an underground source of drinking water.

(2) Wells used by generators of hazardous waste or of radioactive waste, by owners or operators of hazardous waste management facilities, or by owners or operators of radioactive waste disposal sites to dispose of hazardous waste or radioactive waste above a formation which within one quarter (¼) mile of the well contains an underground source of drinking water.

(3) Wells used by generators of hazardous waste or owners or operators of hazardous waste management facilities to dispose of hazardous waste, which cannot be classified under §146.05(a)(1) or §146.05(d) (1) and (2) (e.g., wells used to dispose of hazardous wastes into or above a formation which contains an aquifer which has been exempted pursuant to §146.04).

(e) *Class V.* Injection wells not included in Class I, II, III, IV or VI. Specific types of Class V injection wells are also described in 40 CFR 144.81. Class V wells include:

(1) Air conditioning return flow wells used to return to the supply aquifer the water used for heating or cooling in a heat pump;

(2) Cesspools including multiple dwelling, community or regional cesspools, or other devices that receive wastes which have an open bottom and sometimes have perforated sides. The UIC requirements do not apply to single family residential cesspools nor to non-residential cesspools which receive solely sanitary wastes and have the capacity to serve fewer than 20 persons a day.

(3) Cooling water return flow wells used to inject water previously used for cooling;

(4) Drainage wells used to drain surface fluid, primarily storm runoff, into a subsurface formation;

(5) Dry wells used for the injection of wastes into a subsurface formation;

(6) Recharge wells used to replenish the water in an aquifer;

(7) Salt water intrusion barrier wells used to inject water into a fresh water aquifer to prevent the intrusion of salt water into the fresh water;

(8) Sand backfill and other backfill wells used to inject a mixture of water and sand, mill tailings or other solids into mined out portions of subsurface mines whether what is injected is a radioactive waste or not.

(9) Septic system wells used to inject the waste or effluent from a multiple dwelling, business establishment, community or regional business establishment septic tank. The UIC requirements do not apply to single family residential septic system wells, nor to non-residential septic system wells which are used solely for the disposal of sanitary waste and have the capacity to serve fewer than 20 persons a day.

(10) Subsidence control wells (not used for the purpose of oil or natural

gas production) used to inject fluids into a non-oil or gas producing zone to reduce or eliminate subsidence associated with the overdraft of fresh water;

(11) Radioactive waste disposal wells other than Class IV;

(12) Injection wells associated with the recovery of geothermal energy for heating, aquaculture and production of electric power.

(13) Wells used for solution mining of conventional mines such as stopes leaching;

(14) Wells used to inject spent brine into the same formation from which it was withdrawn after extraction of halogens or their salts;

(15) Injection wells used in experimental technologies.

(16) Injection wells used for in situ recovery of lignite, coal, tar sands, and oil shale.

(f) *Class VI.* Wells that are not experimental in nature that are used for geologic sequestration of carbon dioxide beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at §146.95; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to §§146.4 and 144.7(d) of this chapter.

[45 FR 42500, June 24, 1980, as amended at 46 FR 43161, Aug. 27, 1981; 47 FR 4999, Feb. 3, 1982; 64 FR 68573, Dec. 7, 1999; 75 FR 77291, Dec. 10, 2010]

§146.6 Area of review.

The area of review for each injection well or each field, project or area of the State shall be determined according to either paragraph (a) or (b) of this section. The Director may solicit input from the owners or operators of injection wells within the State as to which method is most appropriate for each geographic area or field.

(a) *Zone of endangering influence.* (1) The zone of endangering influence shall be:

(i) In the case of application(s) for well permit(s) under §122.38 that area the radius of which is the lateral distance in which the pressures in the injection zone may cause the migration of the injection and/or formation fluid into an underground source of drinking water; or

(ii) In the case of an application for an area permit under §122.39, the project area plus a circumscribing area the width of which is the lateral distance from the perimeter of the project area, in which the pressures in the injection zone may cause the migration of the injection and/or formation fluid into an underground source of drinking water.

(2) Computation of the zone of endangering influence may be based upon the parameters listed below and should be calculated for an injection time period equal to the expected life of the injection well or pattern. The following modified Theis equation illustrates one form which the mathematical model may take.

$$r = \left(\frac{2.25\,KHt}{S10^{x}}\right)^{1/2}$$

where:

$$X = \frac{4\pi KH\left(h_w - h_{bo} \times S_p G_b\right)}{2.3Q}$$

r=Radius of endangering influence from injection well (length)

k=Hydraulic conductivity of the injection zone (length/time)

H=Thickness of the injection zone (length)

t=Time of injection (time)

S=Storage coefficient (dimensionless)

Q=Injection rate (volume/time)

h_{bo}=Observed original hydrostatic head of injection zone (length) measured from the base of the lowermost underground source of drinking water

h_w=Hydrostatic head of underground source of drinking water (length) measured from the base of the lowest underground source of drinking water

S_p G_b=Specific gravity of fluid in the injection zone (dimensionless)

π=3.142 (dimensionless)

The above equation is based on the following assumptions:

(i) The injection zone is homogenous and isotropic;

(ii) The injection zone has infinite area extent;

(iii) The injection well penetrates the entire thickness of the injection zone;

seeking authorization to inject pursuant to § 146.15.

[70 FR 70532, Nov. 22, 2005]

Subpart C—Criteria and Standards Applicable to Class II Wells

§ 146.21 Applicability.

This subpart establishes criteria and standards for underground injection control programs to regulate Class II wells.

§ 146.22 Construction requirements.

(a) All new Class II wells shall be sited in such a fashion that they inject into a formation which is separated from any USDW by a confining zone that is free of known open faults or fractures within the area of review.

(b)(1) All Class II injection wells shall be cased and cemented to prevent movement of fluids into or between underground sources of drinking water. The casing and cement used in the construction of each newly drilled well shall be designed for the life expectancy of the well. In determining and specifying casing and cementing requirements, the following factors shall be considered:

(i) Depth to the injection zone;

(ii) Depth to the bottom of all USDWs; and

(iii) Estimated maximum and average injection pressures;

(2) In addition the Director may consider information on:

(i) Nature of formation fluids;

(ii) Lithology of injection and confining zones;

(iii) External pressure, internal pressure, and axial loading;

(iv) Hole size;

(v) Size and grade of all casing strings; and

(vi) Class of cement.

(c) The requirements in paragraph (b) of this section need not apply to existing or newly converted Class II wells located in existing fields if:

(1) Regulatory controls for casing and cementing existed for those wells at the time of drilling and those wells are in compliance with those controls; and

(2) Well injection will not result in the movement of fluids into an underground source of drinking water so as to create a significant risk to the health of persons.

(d) The requirements in paragraph (b) of this section need not apply to newly drilled wells in existing fields if;

(1) They meet the requirements of the State for casing and cementing applicable to that field at the time of submission of the State program to the Administrator; and

(2) Well injection will not result in the movement of fluids into an underground source of drinking water so as to create a significant risk to the health of persons.

(e) Where a State did not have regulatory controls for casing and cementing prior to the time of the submission of the State program to the Administrator, the Director need not apply the casing and cementing requirements in paragraph (b) of this section if he submits as a part of his application for primacy, an appropriate plan for casing and cementing of existing, newly converted, and newly drilled wells in existing fields, and the Administrator approves the plan.

(f) Appropriate logs and other tests shall be conducted during the drilling and construction of new Class II wells. A descriptive report interpreting the results of that portion of those logs and tests which specifically relate to (1) an USDW and the confining zone adjacent to it, and (2) the injection and adjacent formations shall be prepared by a knowledgeable log analyst and submitted to the director. At a minimum, these logs and tests shall include:

(1) Deviation checks on all holes constructed by first drilling a pilot hole and then enlarging the pilot hole, by reaming or another method. Such checks shall be at sufficiently frequent intervals to assure that vertical avenues for fluid movement in the form of diverging holes are not created during drilling.

(2) Such other logs and tests as may be needed after taking into account the availability of similar data in the area of the drilling site, the construction plan, and the need for additional information that may arise from time to time as the construction of the well progresses. In determining which logs

and tests shall be required the following shall be considered by the Director in setting logging and testing requirements:

(i) For surface casing intended to protect underground sources of drinking water in areas where the lithology has not been determined:

(A) Electric and caliper logs before casing is installed; and

(B) A cement bond, temperature, or density log after the casing is set and cemented.

(ii) for intermediate and long strings of casing intended to facilitate injection:

(A) Electric porosity and gamma ray logs before the casing is installed;

(B) Fracture finder logs; and

(C) A cement bond, temperature, or density log after the casing is set and cemented.

(g) At a minimum, the following information concerning the injection formation shall be determined or calculated for new Class II wells or projects:

(1) Fluid pressure;

(2) Estimated fracture pressure;

(3) Physical and chemical characteristics of the injection zone.

[45 FR 42500, June 24, 1980, as amended at 46 FR 43162, Aug. 27, 1981; 47 FR 5000, Feb. 3, 1982]

§ 146.23 Operating, monitoring, and reporting requirements.

(a) *Operating requirements.* Operating requirements shall, at a minimum, specify that:

(1) Injection pressure at the wellhead shall not exceed a maximum which shall be calculated so as to assure that the pressure during injection does not initiate new fractures or propagate existing fractures in the confining zone adjacent to the USDWs. In no case shall injection pressure cause the movement of injection or formation fluids into an underground source of drinking water

(2) Injection between the outermost casing protecting underground sources of drinking water and the well bore shall be prohibited.

(b) *Monitoring requirements.* Monitoring requirements shall, at a minimum, include:

(1) Monitoring of the nature of injected fluids at time intervals sufficiently frequent to yield data representative of their characteristics;

(2) Observation of injection pressure, flow rate, and cumulative volume at least with the following frequencies:

(i) Weekly for produced fluid disposal operations;

(ii) Monthly for enhanced recovery operations;

(iii) Daily during the injection of liquid hydrocarbons and injection for withdrawal of stored hydrocarbons; and

(iv) Daily during the injection phase of cyclic steam operations

And recording of one observation of injection pressure, flow rate and cumulative volume at reasonable intervals no greater than 30 days.

(3) A demonstration of mechanical integrity pursuant to §146.8 at least once every five years during the life of the injection well;

(4) Maintenance of the results of all monitoring until the next permit review (see 40 CFR 144.52(a)(5)); and

(5) Hydrocarbon storage and enhanced recovery may be monitored on a field or project basis rather than on an individual well basis by manifold monitoring. Manifold monitoring may be used in cases of facilities consisting of more than one injection well, operating with a common manifold. Separate monitoring systems for each well are not required provided the owner/operator demonstrates that manifold monitoring is comparable to individual well monitoring.

(c) *Reporting requirements.* (1) Reporting requirements shall at a minimum include an annual report to the Director summarizing the results of monitoring required under paragraph (b) of this section. Such summary shall include monthly records of injected fluids, and any major changes in characteristics or sources of injected fluid. Previously submitted information may be included by reference.

(2) Owners or operators of hydrocarbon storage and enhanced recovery projects may report on a field or project basis rather than an individual

well basis where manifold monitoring is used.

(Clean Water Act, Safe Drinking Water Act, Clean Air Act, Resource Conservation and Recovery Act; 42 U.S.C. 6905, 6912, 6925, 6927, 6974)

[45 FR 42500, June 24, 1980, as amended at 46 FR 43162, Aug. 27, 1981; 47 FR 5000, Feb. 3, 1982; 48 FR 14293, Apr. 1, 1983; 48 FR 31404, July 8, 1983]

§ 146.24 Information to be considered by the Director.

This section sets forth the information which must be considered by the Director in authorizing Class II wells. Certain maps, cross-sections, tabulations of wells within the area of review, and other data may be included in the application by reference provided they are current, readily available to the Director (for example, in the permitting agency's files) and sufficiently identified to be retrieved. In cases where EPA issues the permit, all the information in this section is to be submitted to the Administrator.

(a) Prior to the issuance of a permit for an existing Class II well to operate or the construction or conversion of a new Class II well the Director shall consider the following:

(1) Information required in 40 CFR 144.31 and 144.31(g);

(2) A map showing the injection well or project area for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number or name and location of all existing producing wells, injection wells, abandoned wells, dry holes, and water wells. The map may also show surface bodies of waters, mines (surface and subsurface), quarries and other pertinent surface features including residences and roads, and faults if known or suspended. Only information of public record and pertinent information known to the applicant is required to be included on this map. This requirement does not apply to existing Class II wells; and

(3) A tabulation of data reasonably available from public records or otherwise known to the applicant on all wells within the area of review included on the map required under paragraph (a)(2) of this section which penetrate the proposed injection zone or, in the case of Class II wells operating over the fracture pressure of the injection formation, all known wells within the area of review which penetrate formations affected by the increase in pressure. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of plugging and complete, and any additional information the Director may require. In cases where the information would be repetitive and the wells are of similar age, type, and construction the Director may elect to only require data on a representative number of wells. This requirement does not apply to existing Class II wells.

(4) Proposed operating data:

(i) Average and maximum daily rate and volume of fluids to be injected.

(ii) Average and maximum injection pressure; and

(iii) Source and an appropriate analysis of the chemical and physical characteristics of the injection fluid.

(5) Appropriate geological data on the injection zone and confining zone including lithologic description, geological name, thickness and depth;

(6) Geologic name and depth to bottom of all underground sources of drinking water which may be affected by the injection;

(7) Schematic or other appropriate drawings of the surface and subsurface construction details of the well;

(8) In the case of new injection wells the corrective action proposed to be taken by the applicant under 40 CFR 122.44;

(9) A certificate that the applicant has assured through a performance bond or other appropriate means, the resources necessary to close plug or abandon the well as required by 40 CFR 122.42(g);

(b) In addition the Director may consider the following:

(1) Proposed formation testing program to obtain the information required by §146.22(g);

(2) Proposed stimulation program;

(3) Proposed injection procedure;

(4) Proposed contingency plans, if any, to cope with well failures so as to prevent migration of contaminating fluids into an underground source of drinking water;

(5) Plans for meeting the monitoring requirements of § 146.23(b).

(c) Prior to granting approval for the operation of a Class II well the Director shall consider the following information:

(1) All available logging and testing program data on the well;

(2) A demonstration of mechanical integrity pursuant to § 146.8;

(3) The anticipated maximum pressure and flow rate at which the permittee will operate.

(4) The results of the formation testing program;

(5) The actual injection procedure; and

(6) For new wells the status of corrective action on defective wells in the area of review.

(d) Prior to granting approval for the plugging and abandonment of a Class II well the Director shall consider the following information:

(1) The type, and number of plugs to be used;

(2) The placement of each plug including the elevation of top and bottom;

(3) The type, grade, and quantity of cement to be used;

(4) The method of placement of the plugs; and

(5) The procedure to be used to meet the requirements of § 146.10(c).

(Clean Water Act, Safe Drinking Water Act, Clean Air Act, Resource Conservation and Recovery Act: 42 U.S.C. 6905, 6912, 6925, 6927, 6974)

[45 FR 42500, June 24, 1980, as amended at 46 FR 43162, Aug. 27, 1981; 47 FR 5000, Feb. 3, 1982; 48 FR 14293, Apr. 1, 1983]

Subpart D—Criteria and Standards Applicable to Class III Wells

§ 146.31 Applicability.

This subpart establishes criteria and standards for underground injection control programs to regulate Class III wells.

§ 146.32 Construction requirements.

(a) All new Class III wells shall be cased and cemented to prevent the migration of fluids into or between underground sources of drinking water. The Director may waive the cementing requirement for new wells in existing projects or portions of existing projects where he has substantial evidence that no contamination of underground sources of drinking water would result. The casing and cement used in the construction of each newly drilled well shall be designed for the life expectancy of the well. In determining and specifying casing and cementing requirements, the following factors shall be considered:

(1) Depth to the injection zone;

(2) Injection pressure, external pressure, internal pressure, axial loading, etc.;

(3) Hole size;

(4) Size and grade of all casing strings (wall thickness, diameter, nominal weight, length, joint specification, and construction material);

(5) Corrosiveness of injected fluids and formation fluids;

(6) Lithology of injection and confining zones; and

(7) Type and grade of cement.

(b) Appropriate logs and other tests shall be conducted during the drilling and construction of new Class III wells. A descriptive report interpreting the results of such logs and tests shall be prepared by a knowledgeable log analyst and submitted to the Director. The logs and tests appropriate to each type of Class III well shall be determined based on the intended function, depth, construction and other characteristics of the well, availability of similar data in the area of the drilling site and the need for additional information that may arise from time to time as the construction of the well progresses. Deviation checks shall be conducted on all holes where pilot holes and reaming are used, unless the hole will be cased and cemented by circulating cement to the surface. Where deviation checks are necessary they shall be conducted at sufficiently frequent intervals to assure that vertical avenues for fluid migration in the form of diverging holes are not created during drillings.

(c) Where the injection zone is a formation which is naturally water-bearing the following information concerning the injection zone shall be determined or calculated for new Class III wells or projects:

(1) Fluid pressure;

(2) Fracture pressure; and

trust fund, surety bond, letter of credit, financial test, insurance or corporate guarantee that meets the specifications for the mechanisms and instruments revised as appropriate to cover closure and post-closure care in 40 CFR part 144, subpart F. The amount of the funds available shall be no less than the amount identified in §146.72(a)(4)(vi). The obligation to maintain financial responsibility for post-closure care survives the termination of a permit or the cessation of injection. The requirement to maintain financial responsibility is enforceable regardless of whether the requirement is a condition of the permit.

Subpart H—Criteria and Standards Applicable to Class VI Wells

SOURCE: 75 FR 77291, Dec. 10, 2010, unless otherwise noted.

§ 146.81 Applicability.

(a) This subpart establishes criteria and standards for underground injection control programs to regulate any Class VI carbon dioxide geologic sequestration injection wells.

(b) This subpart applies to any wells used to inject carbon dioxide specifically for the purpose of geologic sequestration, *i.e.*, the long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations.

(c) This subpart also applies to owners or operators of permit- or rule-authorized Class I, Class II, or Class V experimental carbon dioxide injection projects who seek to apply for a Class VI geologic sequestration permit for their well or wells. Owners or operators seeking to convert existing Class I, Class II, or Class V experimental wells to Class VI geologic sequestration wells must demonstrate to the Director that the wells were engineered and constructed to meet the requirements at §146.86(a) and ensure protection of USDWs, in lieu of requirements at §§146.86(b) and 146.87(a). By December 10, 2011, owners or operators of either Class I wells previously permitted for the purpose of geologic sequestration or Class V experimental technology wells no longer being used for experimental purposes that will continue injection of carbon dioxide for the purpose of GS must apply for a Class VI permit. A converted well must still meet all other requirements under part 146.

(d) *Definitions.* The following definitions apply to this subpart. To the extent that these definitions conflict with those in §144.3 or §146.3 of this chapter these definitions govern for Class VI wells:

Area of review means the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. The area of review is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and displaced fluids, and is based on available site characterization, monitoring, and operational data as set forth in §146.84.

Carbon dioxide plume means the extent underground, in three dimensions, of an injected carbon dioxide stream.

Carbon dioxide stream means carbon dioxide that has been captured from an emission source (e.g., a power plant), plus incidental associated substances derived from the source materials and the capture process, and any substances added to the stream to enable or improve the injection process. This subpart does not apply to any carbon dioxide stream that meets the definition of a hazardous waste under 40 CFR part 261.

Confining zone means a geologic formation, group of formations, or part of a formation stratigraphically overlying the injection zone(s) that acts as barrier to fluid movement. For Class VI wells operating under an injection depth waiver, confining zone means a geologic formation, group of formations, or part of a formation stratigraphically overlying and underlying the injection zone(s).

Corrective action means the use of Director-approved methods to ensure that wells within the area of review do not serve as conduits for the movement of fluids into underground sources of drinking water (USDW).

Geologic sequestration means the long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations. This

term does not apply to carbon dioxide capture or transport.

Geologic sequestration project means an injection well or wells used to emplace a carbon dioxide stream beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at §146.95; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to §§146.4 and 144.7(d) of this chapter. It includes the subsurface three-dimensional extent of the carbon dioxide plume, associated area of elevated pressure, and displaced fluids, as well as the surface area above that delineated region.

Injection zone means a geologic formation, group of formations, or part of a formation that is of sufficient areal extent, thickness, porosity, and permeability to receive carbon dioxide through a well or wells associated with a geologic sequestration project.

Post-injection site care means appropriate monitoring and other actions (including corrective action) needed following cessation of injection to ensure that USDWs are not endangered, as required under §146.93.

Pressure front means the zone of elevated pressure that is created by the injection of carbon dioxide into the subsurface. For the purposes of this subpart, the pressure front of a carbon dioxide plume refers to a zone where there is a pressure differential sufficient to cause the movement of injected fluids or formation fluids into a USDW.

Site closure means the point/time, as determined by the Director following the requirements under §146.93, at which the owner or operator of a geologic sequestration site is released from post-injection site care responsibilities.

Transmissive fault or fracture means a fault or fracture that has sufficient permeability and vertical extent to allow fluids to move between formations.

§146.82 Required Class VI permit information.

This section sets forth the information which must be considered by the Director in authorizing Class VI wells. For converted Class I, Class II, or Class V experimental wells, certain maps, cross-sections, tabulations of wells within the area of review and other data may be included in the application by reference provided they are current, readily available to the Director, and sufficiently identified to be retrieved. In cases where EPA issues the permit, all the information in this section must be submitted to the Regional Administrator.

(a) Prior to the issuance of a permit for the construction of a new Class VI well or the conversion of an existing Class I, Class II, or Class V well to a Class VI well, the owner or operator shall submit, pursuant to §146.91(e), and the Director shall consider the following:

(1) Information required in §144.31(e)(1) through (6) of this chapter;

(2) A map showing the injection well for which a permit is sought and the applicable area of review consistent with §146.84. Within the area of review, the map must show the number or name, and location of all injection wells, producing wells, abandoned wells, plugged wells or dry holes, deep stratigraphic boreholes, State- or EPA-approved subsurface cleanup sites, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells, other pertinent surface features including structures intended for human occupancy, State, Tribal, and Territory boundaries, and roads. The map should also show faults, if known or suspected. Only information of public record is required to be included on this map;

(3) Information on the geologic structure and hydrogeologic properties of the proposed storage site and overlying formations, including:

(i) Maps and cross sections of the area of review;

(ii) The location, orientation, and properties of known or suspected faults and fractures that may transect the confining zone(s) in the area of review and a determination that they would not interfere with containment;

(iii) Data on the depth, areal extent, thickness, mineralogy, porosity, permeability, and capillary pressure of the injection and confining zone(s); including geology/facies changes based on field data which may include geologic cores, outcrop data, seismic surveys, well logs, and names and lithologic descriptions;

(iv) Geomechanical information on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone(s);

(v) Information on the seismic history including the presence and depth of seismic sources and a determination that the seismicity would not interfere with containment; and

(vi) Geologic and topographic maps and cross sections illustrating regional geology, hydrogeology, and the geologic structure of the local area.

(4) A tabulation of all wells within the area of review which penetrate the injection or confining zone(s). Such data must include a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require;

(5) Maps and stratigraphic cross sections indicating the general vertical and lateral limits of all USDWs, water wells and springs within the area of review, their positions relative to the injection zone(s), and the direction of water movement, where known;

(6) Baseline geochemical data on subsurface formations, including all USDWs in the area of review;

(7) Proposed operating data for the proposed geologic sequestration site:

(i) Average and maximum daily rate and volume and/or mass and total anticipated volume and/or mass of the carbon dioxide stream;

(ii) Average and maximum injection pressure;

(iii) The source(s) of the carbon dioxide stream; and

(iv) An analysis of the chemical and physical characteristics of the carbon dioxide stream.

(8) Proposed pre-operational formation testing program to obtain an analysis of the chemical and physical characteristics of the injection zone(s) and confining zone(s) and that meets the requirements at § 146.87;

(9) Proposed stimulation program, a description of stimulation fluids to be used and a determination that stimulation will not interfere with containment;

(10) Proposed procedure to outline steps necessary to conduct injection operation;

(11) Schematics or other appropriate drawings of the surface and subsurface construction details of the well;

(12) Injection well construction procedures that meet the requirements of § 146.86;

(13) Proposed area of review and corrective action plan that meets the requirements under § 146.84;

(14) A demonstration, satisfactory to the Director, that the applicant has met the financial responsibility requirements under § 146.85;

(15) Proposed testing and monitoring plan required by § 146.90;

(16) Proposed injection well plugging plan required by § 146.92(b);

(17) Proposed post-injection site care and site closure plan required by § 146.93(a);

(18) At the Director's discretion, a demonstration of an alternative post-injection site care timeframe required by § 146.93(c);

(19) Proposed emergency and remedial response plan required by § 146.94(a);

(20) A list of contacts, submitted to the Director, for those States, Tribes, and Territories identified to be within the area of review of the Class VI project based on information provided in paragraph (a)(2) of this section; and

(21) Any other information requested by the Director.

(b) The Director shall notify, in writing, any States, Tribes, or Territories within the area of review of the Class VI project based on information provided in paragraphs (a)(2) and (a)(20) of this section of the permit application and pursuant to the requirements at § 145.23(f)(13) of this chapter.

(c) Prior to granting approval for the operation of a Class VI well, the Director shall consider the following information:

(1) The final area of review based on modeling, using data obtained during logging and testing of the well and the formation as required by paragraphs

(c)(2), (3), (4), (6), (7), and (10) of this section;

(2) Any relevant updates, based on data obtained during logging and testing of the well and the formation as required by paragraphs (c)(3), (4), (6), (7), and (10) of this section, to the information on the geologic structure and hydrogeologic properties of the proposed storage site and overlying formations, submitted to satisfy the requirements of paragraph (a)(3) of this section;

(3) Information on the compatibility of the carbon dioxide stream with fluids in the injection zone(s) and minerals in both the injection and the confining zone(s), based on the results of the formation testing program, and with the materials used to construct the well;

(4) The results of the formation testing program required at paragraph (a)(8) of this section;

(5) Final injection well construction procedures that meet the requirements of §146.86;

(6) The status of corrective action on wells in the area of review;

(7) All available logging and testing program data on the well required by §146.87;

(8) A demonstration of mechanical integrity pursuant to §146.89;

(9) Any updates to the proposed area of review and corrective action plan, testing and monitoring plan, injection well plugging plan, post-injection site care and site closure plan, or the emergency and remedial response plan submitted under paragraph (a) of this section, which are necessary to address new information collected during logging and testing of the well and the formation as required by all paragraphs of this section, and any updates to the alternative post-injection site care timeframe demonstration submitted under paragraph (a) of this section, which are necessary to address new information collected during the logging and testing of the well and the formation as required by all paragraphs of this section; and

(10) Any other information requested by the Director.

(d) Owners or operators seeking a waiver of the requirement to inject below the lowermost USDW must also refer to §146.95 and submit a supplemental report, as required at §146.95(a). The supplemental report is not part of the permit application.

§146.83 Minimum criteria for siting.

(a) Owners or operators of Class VI wells must demonstrate to the satisfaction of the Director that the wells will be sited in areas with a suitable geologic system. The owners or operators must demonstrate that the geologic system comprises:

(1) An injection zone(s) of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume of the carbon dioxide stream;

(2) Confining zone(s) free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the injected carbon dioxide stream and displaced formation fluids and allow injection at proposed maximum pressures and volumes without initiating or propagating fractures in the confining zone(s).

(b) The Director may require owners or operators of Class VI wells to identify and characterize additional zones that will impede vertical fluid movement, are free of faults and fractures that may interfere with containment, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation, and remediation.

§146.84 Area of review and corrective action.

(a) The area of review is the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. The area of review is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and is based on available site characterization, monitoring, and operational data.

(b) The owner or operator of a Class VI well must prepare, maintain, and comply with a plan to delineate the area of review for a proposed geologic sequestration project, periodically reevaluate the delineation, and perform

corrective action that meets the requirements of this section and is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. As a part of the permit application for approval by the Director, the owner or operator must submit an area of review and corrective action plan that includes the following information:

(1) The method for delineating the area of review that meets the requirements of paragraph (c) of this section, including the model to be used, assumptions that will be made, and the site characterization data on which the model will be based;

(2) A description of:

(i) The minimum fixed frequency, not to exceed five years, at which the owner or operator proposes to reevaluate the area of review;

(ii) The monitoring and operational conditions that would warrant a reevaluation of the area of review prior to the next scheduled reevaluation as determined by the minimum fixed frequency established in paragraph (b)(2)(i) of this section.

(iii) How monitoring and operational data (e.g., injection rate and pressure) will be used to inform an area of review reevaluation; and

(iv) How corrective action will be conducted to meet the requirements of paragraph (d) of this section, including what corrective action will be performed prior to injection and what, if any, portions of the area of review will have corrective action addressed on a phased basis and how the phasing will be determined; how corrective action will be adjusted if there are changes in the area of review; and how site access will be guaranteed for future corrective action.

(c) Owners or operators of Class VI wells must perform the following actions to delineate the area of review and identify all wells that require corrective action:

(1) Predict, using existing site characterization, monitoring and operational data, and computational modeling, the projected lateral and vertical migration of the carbon dioxide plume and formation fluids in the subsurface from the commencement of injection activities until the plume movement ceases, until pressure differentials sufficient to cause the movement of injected fluids or formation fluids into a USDW are no longer present, or until the end of a fixed time period as determined by the Director. The model must:

(i) Be based on detailed geologic data collected to characterize the injection zone(s), confining zone(s) and any additional zones; and anticipated operating data, including injection pressures, rates, and total volumes over the proposed life of the geologic sequestration project;

(ii) Take into account any geologic heterogeneities, other discontinuities, data quality, and their possible impact on model predictions; and

(iii) Consider potential migration through faults, fractures, and artificial penetrations.

(2) Using methods approved by the Director, identify all penetrations, including active and abandoned wells and underground mines, in the area of review that may penetrate the confining zone(s). Provide a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require; and

(3) Determine which abandoned wells in the area of review have been plugged in a manner that prevents the movement of carbon dioxide or other fluids that may endanger USDWs, including use of materials compatible with the carbon dioxide stream.

(d) Owners or operators of Class VI wells must perform corrective action on all wells in the area of review that are determined to need corrective action, using methods designed to prevent the movement of fluid into or between USDWs, including use of materials compatible with the carbon dioxide stream, where appropriate.

(e) At the minimum fixed frequency, not to exceed five years, as specified in the area of review and corrective action plan, or when monitoring and operational conditions warrant, owners or operators must:

(1) Reevaluate the area of review in the same manner specified in paragraph (c)(1) of this section;

(2) Identify all wells in the reevaluated area of review that require corrective action in the same manner specified in paragraph (c) of this section;

(3) Perform corrective action on wells requiring corrective action in the reevaluated area of review in the same manner specified in paragraph (d) of this section; and

(4) Submit an amended area of review and corrective action plan or demonstrate to the Director through monitoring data and modeling results that no amendment to the area of review and corrective action plan is needed. Any amendments to the area of review and corrective action plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §144.39 or §144.41 of this chapter, as appropriate.

(f) The emergency and remedial response plan (as required by §146.94) and the demonstration of financial responsibility (as described by §146.85) must account for the area of review delineated as specified in paragraph (c)(1) of this section or the most recently evaluated area of review delineated under paragraph (e) of this section, regardless of whether or not corrective action in the area of review is phased.

(g) All modeling inputs and data used to support area of review reevaluations under paragraph (e) of this section shall be retained for 10 years.

§146.85 Financial responsibility.

(a) The owner or operator must demonstrate and maintain financial responsibility as determined by the Director that meets the following conditions:

(1) The financial responsibility instrument(s) used must be from the following list of qualifying instruments:

(i) Trust Funds.

(ii) Surety Bonds.

(iii) Letter of Credit.

(iv) Insurance.

(v) Self Insurance (*i.e.*, Financial Test and Corporate Guarantee).

(vi) Escrow Account.

(vii) Any other instrument(s) satisfactory to the Director.

(2) The qualifying instrument(s) must be sufficient to cover the cost of:

(i) Corrective action (that meets the requirements of §146.84);

(ii) Injection well plugging (that meets the requirements of §146.92);

(iii) Post injection site care and site closure (that meets the requirements of §146.93); and

(iv) Emergency and remedial response (that meets the requirements of §146.94).

(3) The financial responsibility instrument(s) must be sufficient to address endangerment of underground sources of drinking water.

(4) The qualifying financial responsibility instrument(s) must comprise protective conditions of coverage.

(i) Protective conditions of coverage must include at a minimum cancellation, renewal, and continuation provisions, specifications on when the provider becomes liable following a notice of cancellation if there is a failure to renew with a new qualifying financial instrument, and requirements for the provider to meet a minimum rating, minimum capitalization, and ability to pass the bond rating when applicable.

(A) *Cancellation*—for purposes of this part, an owner or operator must provide that their financial mechanism may not cancel, terminate or fail to renew except for failure to pay such financial instrument. If there is a failure to pay the financial instrument, the financial institution may elect to cancel, terminate, or fail to renew the instrument by sending notice by certified mail to the owner or operator and the Director. The cancellation must not be final for 120 days after receipt of cancellation notice. The owner or operator must provide an alternate financial responsibility demonstration within 60 days of notice of cancellation, and if an alternate financial responsibility demonstration is not acceptable (or possible), any funds from the instrument being cancelled must be released within 60 days of notification by the Director.

(B) *Renewal*—for purposes of this part, owners or operators must renew all financial instruments, if an instrument expires, for the entire term of the

geologic sequestration project. The instrument may be automatically renewed as long as the owner or operator has the option of renewal at the face amount of the expiring instrument. The automatic renewal of the instrument must, at a minimum, provide the holder with the option of renewal at the face amount of the expiring financial instrument.

(C) Cancellation, termination, or failure to renew may not occur and the financial instrument will remain in full force and effect in the event that on or before the date of expiration: The Director deems the facility abandoned; or the permit is terminated or revoked or a new permit is denied; or closure is ordered by the Director or a U.S. district court or other court of competent jurisdiction; or the owner or operator is named as debtor in a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code; or the amount due is paid.

(5) The qualifying financial responsibility instrument(s) must be approved by the Director.

(i) The Director shall consider and approve the financial responsibility demonstration for all the phases of the geologic sequestration project prior to issue a Class VI permit (§ 146.82).

(ii) The owner or operator must provide any updated information related to their financial responsibility instrument(s) on an annual basis and if there are any changes, the Director must evaluate, within a reasonable time, the financial responsibility demonstration to confirm that the instrument(s) used remain adequate for use. The owner or operator must maintain financial responsibility requirements regardless of the status of the Director's review of the financial responsibility demonstration.

(iii) The Director may disapprove the use of a financial instrument if he determines that it is not sufficient to meet the requirements of this section.

(6) The owner or operator may demonstrate financial responsibility by using one or multiple qualifying financial instruments for specific phases of the geologic sequestration project.

(i) In the event that the owner or operator combines more than one instrument for a specific geologic sequestration phase (e.g., well plugging), such combination must be limited to instruments that are not based on financial strength or performance (*i.e.*, self insurance or performance bond), for example trust funds, surety bonds guaranteeing payment into a trust fund, letters of credit, escrow account, and insurance. In this case, it is the combination of mechanisms, rather than the single mechanism, which must provide financial responsibility for an amount at least equal to the current cost estimate.

(ii) When using a third-party instrument to demonstrate financial responsibility, the owner or operator must provide a proof that the third-party providers either have passed financial strength requirements based on credit ratings; or has met a minimum rating, minimum capitalization, and ability to pass the bond rating when applicable.

(iii) An owner or operator using certain types of third-party instruments must establish a standby trust to enable EPA to be party to the financial responsibility agreement without EPA being the beneficiary of any funds. The standby trust fund must be used along with other financial responsibility instruments (e.g., surety bonds, letters of credit, or escrow accounts) to provide a location to place funds if needed.

(iv) An owner or operator may deposit money to an escrow account to cover financial responsibility requirements; this account must segregate funds sufficient to cover estimated costs for Class VI (geologic sequestration) financial responsibility from other accounts and uses.

(v) An owner or operator or its guarantor may use self insurance to demonstrate financial responsibility for geologic sequestration projects. In order to satisfy this requirement the owner or operator must meet a Tangible Net Worth of an amount approved by the Director, have a Net working capital and tangible net worth each at least six times the sum of the current well plugging, post injection site care and site closure cost, have assets located in the United States amounting to at least 90 percent of total assets or at least six times the sum of the current well plugging, post injection site care and site closure cost, and must

submit a report of its bond rating and financial information annually. In addition the owner or operator must either: Have a bond rating test of AAA, AA, A, or BBB as issued by Standard & Poor's or Aaa, Aa, A, or Baa as issued by Moody's; or meet all of the following five financial ratio thresholds: A ratio of total liabilities to net worth less than 2.0; a ratio of current assets to current liabilities greater than 1.5; a ratio of the sum of net income plus depreciation, depletion, and amortization to total liabilities greater than 0.1; A ratio of current assets minus current liabilities to total assets greater than −0.1; and a net profit (revenues minus expenses) greater than 0.

(vi) An owner or operator who is not able to meet corporate financial test criteria may arrange a corporate guarantee by demonstrating that its corporate parent meets the financial test requirements on its behalf. The parent's demonstration that it meets the financial test requirement is insufficient if it has not also guaranteed to fulfill the obligations for the owner or operator.

(vii) An owner or operator may obtain an insurance policy to cover the estimated costs of geologic sequestration activities requiring financial responsibility. This insurance policy must be obtained from a third party provider.

(b) The requirement to maintain adequate financial responsibility and resources is directly enforceable regardless of whether the requirement is a condition of the permit.

(1) The owner or operator must maintain financial responsibility and resources until:

(i) The Director receives and approves the completed post-injection site care and site closure plan; and

(ii) The Director approves site closure.

(2) The owner or operator may be released from a financial instrument in the following circumstances:

(i) The owner or operator has completed the phase of the geologic sequestration project for which the financial instrument was required and has fulfilled all its financial obligations as determined by the Director, including obtaining financial responsibility for the next phase of the GS project, if required; or

(ii) The owner or operator has submitted a replacement financial instrument and received written approval from the Director accepting the new financial instrument and releasing the owner or operator from the previous financial instrument.

(c) The owner or operator must have a detailed written estimate, in current dollars, of the cost of performing corrective action on wells in the area of review, plugging the injection well(s), post-injection site care and site closure, and emergency and remedial response.

(1) The cost estimate must be performed for each phase separately and must be based on the costs to the regulatory agency of hiring a third party to perform the required activities. A third party is a party who is not within the corporate structure of the owner or operator.

(2) During the active life of the geologic sequestration project, the owner or operator must adjust the cost estimate for inflation within 60 days prior to the anniversary date of the establishment of the financial instrument(s) used to comply with paragraph (a) of this section and provide this adjustment to the Director. The owner or operator must also provide to the Director written updates of adjustments to the cost estimate within 60 days of any amendments to the area of review and corrective action plan (§146.84), the injection well plugging plan (§146.92), the post-injection site care and site closure plan (§146.93), and the emergency and remedial response plan (§146.94).

(3) The Director must approve any decrease or increase to the initial cost estimate. During the active life of the geologic sequestration project, the owner or operator must revise the cost estimate no later than 60 days after the Director has approved the request to modify the area of review and corrective action plan (§146.84), the injection well plugging plan (§146.92), the post-injection site care and site closure plan (§146.93), and the emergency and response plan (§146.94), if the change in the plan increases the cost. If the change to the plans decreases the cost,

any withdrawal of funds must be approved by the Director. Any decrease to the value of the financial assurance instrument must first be approved by the Director. The revised cost estimate must be adjusted for inflation as specified at paragraph (c)(2) of this section.

(4) Whenever the current cost estimate increases to an amount greater than the face amount of a financial instrument currently in use, the owner or operator, within 60 days after the increase, must either cause the face amount to be increased to an amount at least equal to the current cost estimate and submit evidence of such increase to the Director, or obtain other financial responsibility instruments to cover the increase. Whenever the current cost estimate decreases, the face amount of the financial assurance instrument may be reduced to the amount of the current cost estimate only after the owner or operator has received written approval from the Director.

(d) The owner or operator must notify the Director by certified mail of adverse financial conditions such as bankruptcy that may affect the ability to carry out injection well plugging and post-injection site care and site closure.

(1) In the event that the owner or operator or the third party provider of a financial responsibility instrument is going through a bankruptcy, the owner or operator must notify the Director by certified mail of the commencement of a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code, naming the owner or operator as debtor, within 10 days after commencement of the proceeding.

(2) A guarantor of a corporate guarantee must make such a notification to the Director if he/she is named as debtor, as required under the terms of the corporate guarantee.

(3) An owner or operator who fulfills the requirements of paragraph (a) of this section by obtaining a trust fund, surety bond, letter of credit, escrow account, or insurance policy will be deemed to be without the required financial assurance in the event of bankruptcy of the trustee or issuing institution, or a suspension or revocation of the authority of the trustee institution to act as trustee of the institution issuing the trust fund, surety bond, letter of credit, escrow account, or insurance policy. The owner or operator must establish other financial assurance within 60 days after such an event.

(e) The owner or operator must provide an adjustment of the cost estimate to the Director within 60 days of notification by the Director, if the Director determines during the annual evaluation of the qualifying financial responsibility instrument(s) that the most recent demonstration is no longer adequate to cover the cost of corrective action (as required by §146.84), injection well plugging (as required by §146.92), post-injection site care and site closure (as required by §146.93), and emergency and remedial response (as required by §146.94).

(f) The Director must approve the use and length of pay-in-periods for trust funds or escrow accounts.

§146.86 Injection well construction requirements.

(a) *General.* The owner or operator must ensure that all Class VI wells are constructed and completed to:

(1) Prevent the movement of fluids into or between USDWs or into any unauthorized zones;

(2) Permit the use of appropriate testing devices and workover tools; and

(3) Permit continuous monitoring of the annulus space between the injection tubing and long string casing.

(b) *Casing and cementing of Class VI wells.* (1) Casing and cement or other materials used in the construction of each Class VI well must have sufficient structural strength and be designed for the life of the geologic sequestration project. All well materials must be compatible with fluids with which the materials may be expected to come into contact and must meet or exceed standards developed for such materials by the American Petroleum Institute, ASTM International, or comparable standards acceptable to the Director. The casing and cementing program must be designed to prevent the movement of fluids into or between USDWs. In order to allow the Director to determine and specify casing and cementing requirements, the owner or operator

must provide the following information:

(i) Depth to the injection zone(s);

(ii) Injection pressure, external pressure, internal pressure, and axial loading;

(iii) Hole size;

(iv) Size and grade of all casing strings (wall thickness, external diameter, nominal weight, length, joint specification, and construction material);

(v) Corrosiveness of the carbon dioxide stream and formation fluids;

(vi) Down-hole temperatures;

(vii) Lithology of injection and confining zone(s);

(viii) Type or grade of cement and cement additives; and

(ix) Quantity, chemical composition, and temperature of the carbon dioxide stream.

(2) Surface casing must extend through the base of the lowermost USDW and be cemented to the surface through the use of a single or multiple strings of casing and cement.

(3) At least one long string casing, using a sufficient number of centralizers, must extend to the injection zone and must be cemented by circulating cement to the surface in one or more stages.

(4) Circulation of cement may be accomplished by staging. The Director may approve an alternative method of cementing in cases where the cement cannot be recirculated to the surface, provided the owner or operator can demonstrate by using logs that the cement does not allow fluid movement behind the well bore.

(5) Cement and cement additives must be compatible with the carbon dioxide stream and formation fluids and of sufficient quality and quantity to maintain integrity over the design life of the geologic sequestration project. The integrity and location of the cement shall be verified using technology capable of evaluating cement quality radially and identifying the location of channels to ensure that USDWs are not endangered.

(c) *Tubing and packer.* (1) Tubing and packer materials used in the construction of each Class VI well must be compatible with fluids with which the materials may be expected to come into contact and must meet or exceed standards developed for such materials by the American Petroleum Institute, ASTM International, or comparable standards acceptable to the Director.

(2) All owners or operators of Class VI wells must inject fluids through tubing with a packer set at a depth opposite a cemented interval at the location approved by the Director.

(3) In order for the Director to determine and specify requirements for tubing and packer, the owner or operator must submit the following information:

(i) Depth of setting;

(ii) Characteristics of the carbon dioxide stream (chemical content, corrosiveness, temperature, and density) and formation fluids;

(iii) Maximum proposed injection pressure;

(iv) Maximum proposed annular pressure;

(v) Proposed injection rate (intermittent or continuous) and volume and/or mass of the carbon dioxide stream;

(vi) Size of tubing and casing; and

(vii) Tubing tensile, burst, and collapse strengths.

§ 146.87 Logging, sampling, and testing prior to injection well operation.

(a) During the drilling and construction of a Class VI injection well, the owner or operator must run appropriate logs, surveys and tests to determine or verify the depth, thickness, porosity, permeability, and lithology of, and the salinity of any formation fluids in all relevant geologic formations to ensure conformance with the injection well construction requirements under §146.86 and to establish accurate baseline data against which future measurements may be compared. The owner or operator must submit to the Director a descriptive report prepared by a knowledgeable log analyst that includes an interpretation of the results of such logs and tests. At a minimum, such logs and tests must include:

(1) Deviation checks during drilling on all holes constructed by drilling a pilot hole which is enlarged by reaming or another method. Such checks must be at sufficiently frequent intervals to determine the location of the borehole and to ensure that vertical avenues for

fluid movement in the form of diverging holes are not created during drilling; and

(2) Before and upon installation of the surface casing:

(i) Resistivity, spontaneous potential, and caliper logs before the casing is installed; and

(ii) A cement bond and variable density log to evaluate cement quality radially, and a temperature log after the casing is set and cemented.

(3) Before and upon installation of the long string casing:

(i) Resistivity, spontaneous potential, porosity, caliper, gamma ray, fracture finder logs, and any other logs the Director requires for the given geology before the casing is installed; and

(ii) A cement bond and variable density log, and a temperature log after the casing is set and cemented.

(4) A series of tests designed to demonstrate the internal and external mechanical integrity of injection wells, which may include:

(i) A pressure test with liquid or gas;

(ii) A tracer survey such as oxygen-activation logging;

(iii) A temperature or noise log;

(iv) A casing inspection log; and

(5) Any alternative methods that provide equivalent or better information and that are required by and/or approved of by the Director.

(b) The owner or operator must take whole cores or sidewall cores of the injection zone and confining system and formation fluid samples from the injection zone(s), and must submit to the Director a detailed report prepared by a log analyst that includes: Well log analyses (including well logs), core analyses, and formation fluid sample information. The Director may accept information on cores from nearby wells if the owner or operator can demonstrate that core retrieval is not possible and that such cores are representative of conditions at the well. The Director may require the owner or operator to core other formations in the borehole.

(c) The owner or operator must record the fluid temperature, pH, conductivity, reservoir pressure, and static fluid level of the injection zone(s).

(d) At a minimum, the owner or operator must determine or calculate the following information concerning the injection and confining zone(s):

(1) Fracture pressure;

(2) Other physical and chemical characteristics of the injection and confining zone(s); and

(3) Physical and chemical characteristics of the formation fluids in the injection zone(s).

(e) Upon completion, but prior to operation, the owner or operator must conduct the following tests to verify hydrogeologic characteristics of the injection zone(s):

(1) A pressure fall-off test; and,

(2) A pump test; or

(3) Injectivity tests.

(f) The owner or operator must provide the Director with the opportunity to witness all logging and testing by this subpart. The owner or operator must submit a schedule of such activities to the Director 30 days prior to conducting the first test and submit any changes to the schedule 30 days prior to the next scheduled test.

§ 146.88 Injection well operating requirements.

(a) Except during stimulation, the owner or operator must ensure that injection pressure does not exceed 90 percent of the fracture pressure of the injection zone(s) so as to ensure that the injection does not initiate new fractures or propagate existing fractures in the injection zone(s). In no case may injection pressure initiate fractures in the confining zone(s) or cause the movement of injection or formation fluids that endangers a USDW. Pursuant to requirements at § 146.82(a)(9), all stimulation programs must be approved by the Director as part of the permit application and incorporated into the permit.

(b) Injection between the outermost casing protecting USDWs and the well bore is prohibited.

(c) The owner or operator must fill the annulus between the tubing and the long string casing with a non-corrosive fluid approved by the Director. The owner or operator must maintain on the annulus a pressure that exceeds the operating injection pressure, unless the Director determines that such requirement might harm the integrity of the well or endanger USDWs.

(d) Other than during periods of well workover (maintenance) approved by the Director in which the sealed tubing-casing annulus is disassembled for maintenance or corrective procedures, the owner or operator must maintain mechanical integrity of the injection well at all times.

(e) The owner or operator must install and use:

(1) Continuous recording devices to monitor: The injection pressure; the rate, volume and/or mass, and temperature of the carbon dioxide stream; and the pressure on the annulus between the tubing and the long string casing and annulus fluid volume; and

(2) Alarms and automatic surface shut-off systems or, at the discretion of the Director, down-hole shut-off systems (e.g., automatic shut-off, check valves) for onshore wells or, other mechanical devices that provide equivalent protection; and

(3) Alarms and automatic down-hole shut-off systems for wells located offshore but within State territorial waters, designed to alert the operator and shut-in the well when operating parameters such as annulus pressure, injection rate, or other parameters diverge beyond permitted ranges and/or gradients specified in the permit.

(f) If a shutdown (*i.e.*, down-hole or at the surface) is triggered or a loss of mechanical integrity is discovered, the owner or operator must immediately investigate and identify as expeditiously as possible the cause of the shutoff. If, upon such investigation, the well appears to be lacking mechanical integrity, or if monitoring required under paragraph (e) of this section otherwise indicates that the well may be lacking mechanical integrity, the owner or operator must:

(1) Immediately cease injection;

(2) Take all steps reasonably necessary to determine whether there may have been a release of the injected carbon dioxide stream or formation fluids into any unauthorized zone;

(3) Notify the Director within 24 hours;

(4) Restore and demonstrate mechanical integrity to the satisfaction of the Director prior to resuming injection; and

(5) Notify the Director when injection can be expected to resume.

§ 146.89 Mechanical integrity.

(a) A Class VI well has mechanical integrity if:

(1) There is no significant leak in the casing, tubing, or packer; and

(2) There is no significant fluid movement into a USDW through channels adjacent to the injection well bore.

(b) To evaluate the absence of significant leaks under paragraph (a)(1) of this section, owners or operators must, following an initial annulus pressure test, continuously monitor injection pressure, rate, injected volumes; pressure on the annulus between tubing and long-string casing; and annulus fluid volume as specified in §146.88 (e);

(c) At least once per year, the owner or operator must use one of the following methods to determine the absence of significant fluid movement under paragraph (a)(2) of this section:

(1) An approved tracer survey such as an oxygen-activation log; or

(2) A temperature or noise log.

(d) If required by the Director, at a frequency specified in the testing and monitoring plan required at §146.90, the owner or operator must run a casing inspection log to determine the presence or absence of corrosion in the long-string casing.

(e) The Director may require any other test to evaluate mechanical integrity under paragraphs (a)(1) or (a)(2) of this section. Also, the Director may allow the use of a test to demonstrate mechanical integrity other than those listed above with the written approval of the Administrator. To obtain approval for a new mechanical integrity test, the Director must submit a written request to the Administrator setting forth the proposed test and all technical data supporting its use. The Administrator may approve the request if he or she determines that it will reliably demonstrate the mechanical integrity of wells for which its use is proposed. Any alternate method approved by the Administrator will be published in the FEDERAL REGISTER and may be used in all States in accordance with applicable State law unless its use is restricted at the time of approval by the Administrator.

(f) In conducting and evaluating the tests enumerated in this section or others to be allowed by the Director, the owner or operator and the Director must apply methods and standards generally accepted in the industry. When the owner or operator reports the results of mechanical integrity tests to the Director, he/she shall include a description of the test(s) and the method(s) used. In making his/her evaluation, the Director must review monitoring and other test data submitted since the previous evaluation.

(g) The Director may require additional or alternative tests if the results presented by the owner or operator under paragraphs (a) through (d) of this section are not satisfactory to the Director to demonstrate that there is no significant leak in the casing, tubing, or packer, or to demonstrate that there is no significant movement of fluid into a USDW resulting from the injection activity as stated in paragraphs (a)(1) and (2) of this section.

§ 146.90 Testing and monitoring requirements.

The owner or operator of a Class VI well must prepare, maintain, and comply with a testing and monitoring plan to verify that the geologic sequestration project is operating as permitted and is not endangering USDWs. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. The testing and monitoring plan must be submitted with the permit application, for Director approval, and must include a description of how the owner or operator will meet the requirements of this section, including accessing sites for all necessary monitoring and testing during the life of the project. Testing and monitoring associated with geologic sequestration projects must, at a minimum, include:

(a) Analysis of the carbon dioxide stream with sufficient frequency to yield data representative of its chemical and physical characteristics;

(b) Installation and use, except during well workovers as defined in §146.88(d), of continuous recording devices to monitor injection pressure, rate, and volume; the pressure on the annulus between the tubing and the long string casing; and the annulus fluid volume added;

(c) Corrosion monitoring of the well materials for loss of mass, thickness, cracking, pitting, and other signs of corrosion, which must be performed on a quarterly basis to ensure that the well components meet the minimum standards for material strength and performance set forth in §146.86(b), by:

(1) Analyzing coupons of the well construction materials placed in contact with the carbon dioxide stream; or

(2) Routing the carbon dioxide stream through a loop constructed with the material used in the well and inspecting the materials in the loop; or

(3) Using an alternative method approved by the Director;

(d) Periodic monitoring of the ground water quality and geochemical changes above the confining zone(s) that may be a result of carbon dioxide movement through the confining zone(s) or additional identified zones including:

(1) The location and number of monitoring wells based on specific information about the geologic sequestration project, including injection rate and volume, geology, the presence of artificial penetrations, and other factors; and

(2) The monitoring frequency and spatial distribution of monitoring wells based on baseline geochemical data that has been collected under §146.82(a)(6) and on any modeling results in the area of review evaluation required by §146.84(c).

(e) A demonstration of external mechanical integrity pursuant to §146.89(c) at least once per year until the injection well is plugged; and, if required by the Director, a casing inspection log pursuant to requirements at §146.89(d) at a frequency established in the testing and monitoring plan;

(f) A pressure fall-off test at least once every five years unless more frequent testing is required by the Director based on site-specific information;

(g) Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using:

(1) Direct methods in the injection zone(s); and,

(2) Indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines, based on site-specific geology, that such methods are not appropriate;

(h) The Director may require surface air monitoring and/or soil gas monitoring to detect movement of carbon dioxide that could endanger a USDW.

(1) Design of Class VI surface air and/or soil gas monitoring must be based on potential risks to USDWs within the area of review;

(2) The monitoring frequency and spatial distribution of surface air monitoring and/or soil gas monitoring must be decided using baseline data, and the monitoring plan must describe how the proposed monitoring will yield useful information on the area of review delineation and/or compliance with standards under §144.12 of this chapter;

(3) If an owner or operator demonstrates that monitoring employed under §§98.440 to 98.449 of this chapter (Clean Air Act, 42 U.S.C. 7401 *et seq.*) accomplishes the goals of paragraphs (h)(1) and (2) of this section, and meets the requirements pursuant to §146.91(c)(5), a Director that requires surface air/soil gas monitoring must approve the use of monitoring employed under §§98.440 to 98.449 of this chapter. Compliance with §§98.440 to 98.449 of this chapter pursuant to this provision is considered a condition of the Class VI permit;

(i) Any additional monitoring, as required by the Director, necessary to support, upgrade, and improve computational modeling of the area of review evaluation required under §146.84(c) and to determine compliance with standards under §144.12 of this chapter;

(j) The owner or operator shall periodically review the testing and monitoring plan to incorporate monitoring data collected under this subpart, operational data collected under §146.88, and the most recent area of review reevaluation performed under §146.84(e). In no case shall the owner or operator review the testing and monitoring plan less often than once every five years. Based on this review, the owner or operator shall submit an amended testing and monitoring plan or demonstrate to the Director that no amendment to the testing and monitoring plan is needed. Any amendments to the testing and monitoring plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §144.39 or §144.41 of this chapter, as appropriate. Amended plans or demonstrations shall be submitted to the Director as follows:

(1) Within one year of an area of review reevaluation;

(2) Following any significant changes to the facility, such as addition of monitoring wells or newly permitted injection wells within the area of review, on a schedule determined by the Director; or

(3) When required by the Director.

(k) A quality assurance and surveillance plan for all testing and monitoring requirements.

§ 146.91 Reporting requirements.

The owner or operator must, at a minimum, provide, as specified in paragraph (e) of this section, the following reports to the Director, for each permitted Class VI well:

(a) Semi-annual reports containing:

(1) Any changes to the physical, chemical, and other relevant characteristics of the carbon dioxide stream from the proposed operating data;

(2) Monthly average, maximum, and minimum values for injection pressure, flow rate and volume, and annular pressure;

(3) A description of any event that exceeds operating parameters for annulus pressure or injection pressure specified in the permit;

(4) A description of any event which triggers a shut-off device required pursuant to §146.88(e) and the response taken;

(5) The monthly volume and/or mass of the carbon dioxide stream injected over the reporting period and the volume injected cumulatively over the life of the project;

(6) Monthly annulus fluid volume added; and

(7) The results of monitoring prescribed under §146.90.

(b) Report, within 30 days, the results of:

(1) Periodic tests of mechanical integrity;

(2) Any well workover; and,

(3) Any other test of the injection well conducted by the permittee if required by the Director.

(c) Report, within 24 hours:

(1) Any evidence that the injected carbon dioxide stream or associated pressure front may cause an endangerment to a USDW;

(2) Any noncompliance with a permit condition, or malfunction of the injection system, which may cause fluid migration into or between USDWs;

(3) Any triggering of a shut-off system (*i.e.*, down-hole or at the surface);

(4) Any failure to maintain mechanical integrity; or.

(5) Pursuant to compliance with the requirement at §146.90(h) for surface air/soil gas monitoring or other monitoring technologies, if required by the Director, any release of carbon dioxide to the atmosphere or biosphere.

(d) Owners or operators must notify the Director in writing 30 days in advance of:

(1) Any planned well workover;

(2) Any planned stimulation activities, other than stimulation for formation testing conducted under §146.82; and

(3) Any other planned test of the injection well conducted by the permittee.

(e) Regardless of whether a State has primary enforcement responsibility, owners or operators must submit all required reports, submittals, and notifications under subpart H of this part to EPA in an electronic format approved by EPA.

(f) Records shall be retained by the owner or operator as follows:

(1) All data collected under §146.82 for Class VI permit applications shall be retained throughout the life of the geologic sequestration project and for 10 years following site closure.

(2) Data on the nature and composition of all injected fluids collected pursuant to §146.90(a) shall be retained until 10 years after site closure. The Director may require the owner or operator to deliver the records to the Director at the conclusion of the retention period.

(3) Monitoring data collected pursuant to §146.90(b) through (i) shall be retained for 10 years after it is collected.

(4) Well plugging reports, post-injection site care data, including, if appropriate, data and information used to develop the demonstration of the alternative post-injection site care timeframe, and the site closure report collected pursuant to requirements at §§146.93(f) and (h) shall be retained for 10 years following site closure.

(5) The Director has authority to require the owner or operator to retain any records required in this subpart for longer than 10 years after site closure.

§146.92 Injection well plugging.

(a) Prior to the well plugging, the owner or operator must flush each Class VI injection well with a buffer fluid, determine bottomhole reservoir pressure, and perform a final external mechanical integrity test.

(b) *Well plugging plan.* The owner or operator of a Class VI well must prepare, maintain, and comply with a plan that is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. The well plugging plan must be submitted as part of the permit application and must include the following information:

(1) Appropriate tests or measures for determining bottomhole reservoir pressure;

(2) Appropriate testing methods to ensure external mechanical integrity as specified in §146.89;

(3) The type and number of plugs to be used;

(4) The placement of each plug, including the elevation of the top and bottom of each plug;

(5) The type, grade, and quantity of material to be used in plugging. The material must be compatible with the carbon dioxide stream; and

(6) The method of placement of the plugs.

(c) *Notice of intent to plug.* The owner or operator must notify the Director in writing pursuant to §146.91(e), at least 60 days before plugging of a well. At this time, if any changes have been made to the original well plugging

plan, the owner or operator must also provide the revised well plugging plan. The Director may allow for a shorter notice period. Any amendments to the injection well plugging plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §144.39 or §144.41 of this chapter, as appropriate.

(d) *Plugging report.* Within 60 days after plugging, the owner or operator must submit, pursuant to §146.91(e), a plugging report to the Director. The report must be certified as accurate by the owner or operator and by the person who performed the plugging operation (if other than the owner or operator.) The owner or operator shall retain the well plugging report for 10 years following site closure.

§ 146.93 Post-injection site care and site closure.

(a) The owner or operator of a Class VI well must prepare, maintain, and comply with a plan for post-injection site care and site closure that meets the requirements of paragraph (a)(2) of this section and is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.

(1) The owner or operator must submit the post-injection site care and site closure plan as a part of the permit application to be approved by the Director.

(2) The post-injection site care and site closure plan must include the following information:

(i) The pressure differential between pre-injection and predicted post-injection pressures in the injection zone(s);

(ii) The predicted position of the carbon dioxide plume and associated pressure front at site closure as demonstrated in the area of review evaluation required under §146.84(c)(1);

(iii) A description of post-injection monitoring location, methods, and proposed frequency;

(iv) A proposed schedule for submitting post-injection site care monitoring results to the Director pursuant to §146.91(e); and,

(v) The duration of the post-injection site care timeframe and, if approved by the Director, the demonstration of the alternative post-injection site care timeframe that ensures non-endangerment of USDWs.

(3) Upon cessation of injection, owners or operators of Class VI wells must either submit an amended post-injection site care and site closure plan or demonstrate to the Director through monitoring data and modeling results that no amendment to the plan is needed. Any amendments to the post-injection site care and site closure plan must be approved by the Director, be incorporated into the permit, and are subject to the permit modification requirements at §144.39 or §144.41 of this chapter, as appropriate.

(4) At any time during the life of the geologic sequestration project, the owner or operator may modify and resubmit the post-injection site care and site closure plan for the Director's approval within 30 days of such change.

(b) The owner or operator shall monitor the site following the cessation of injection to show the position of the carbon dioxide plume and pressure front and demonstrate that USDWs are not being endangered.

(1) Following the cessation of injection, the owner or operator shall continue to conduct monitoring as specified in the Director-approved post-injection site care and site closure plan for at least 50 years or for the duration of the alternative timeframe approved by the Director pursuant to requirements in paragraph (c) of this section, unless he/she makes a demonstration under (b)(2) of this section. The monitoring must continue until the geologic sequestration project no longer poses an endangerment to USDWs and the demonstration under (b)(2) of this section is submitted and approved by the Director.

(2) If the owner or operator can demonstrate to the satisfaction of the Director before 50 years or prior to the end of the approved alternative timeframe based on monitoring and other site-specific data, that the geologic sequestration project no longer poses an endangerment to USDWs, the Director may approve an amendment to the post-injection site care and site closure

plan to reduce the frequency of monitoring or may authorize site closure before the end of the 50-year period or prior to the end of the approved alternative timeframe, where he or she has substantial evidence that the geologic sequestration project no longer poses a risk of endangerment to USDWs.

(3) Prior to authorization for site closure, the owner or operator must submit to the Director for review and approval a demonstration, based on monitoring and other site-specific data, that no additional monitoring is needed to ensure that the geologic sequestration project does not pose an endangerment to USDWs.

(4) If the demonstration in paragraph (b)(3) of this section cannot be made (*i.e.*, additional monitoring is needed to ensure that the geologic sequestration project does not pose an endangerment to USDWs) at the end of the 50-year period or at the end of the approved alternative timeframe, or if the Director does not approve the demonstration, the owner or operator must submit to the Director a plan to continue post-injection site care until a demonstration can be made and approved by the Director.

(c) *Demonstration of alternative post-injection site care timeframe.* At the Director's discretion, the Director may approve, in consultation with EPA, an alternative post-injection site care timeframe other than the 50 year default, if an owner or operator can demonstrate during the permitting process that an alternative post-injection site care timeframe is appropriate and ensures non-endangerment of USDWs. The demonstration must be based on significant, site-specific data and information including all data and information collected pursuant to §§146.82 and 146.83, and must contain substantial evidence that the geologic sequestration project will no longer pose a risk of endangerment to USDWs at the end of the alternative post-injection site care timeframe.

(1) A demonstration of an alternative post-injection site care timeframe must include consideration and documentation of:

(i) The results of computational modeling performed pursuant to delineation of the area of review under §146.84;

(ii) The predicted timeframe for pressure decline within the injection zone, and any other zones, such that formation fluids may not be forced into any USDWs; and/or the timeframe for pressure decline to pre-injection pressures;

(iii) The predicted rate of carbon dioxide plume migration within the injection zone, and the predicted timeframe for the cessation of migration;

(iv) A description of the site-specific processes that will result in carbon dioxide trapping including immobilization by capillary trapping, dissolution, and mineralization at the site;

(v) The predicted rate of carbon dioxide trapping in the immobile capillary phase, dissolved phase, and/or mineral phase;

(vi) The results of laboratory analyses, research studies, and/or field or site-specific studies to verify the information required in paragraphs (iv) and (v) of this section;

(vii) A characterization of the confining zone(s) including a demonstration that it is free of transmissive faults, fractures, and micro-fractures and of appropriate thickness, permeability, and integrity to impede fluid (e.g., carbon dioxide, formation fluids) movement;

(viii) The presence of potential conduits for fluid movement including planned injection wells and project monitoring wells associated with the proposed geologic sequestration project or any other projects in proximity to the predicted/modeled, final extent of the carbon dioxide plume and area of elevated pressure;

(ix) A description of the well construction and an assessment of the quality of plugs of all abandoned wells within the area of review;

(x) The distance between the injection zone and the nearest USDWs above and/or below the injection zone; and

(xi) Any additional site-specific factors required by the Director.

(2) Information submitted to support the demonstration in paragraph (c)(1) of this section must meet the following criteria:

(i) All analyses and tests performed to support the demonstration must be accurate, reproducible, and performed in accordance with the established quality assurance standards;

(ii) Estimation techniques must be appropriate and EPA-certified test protocols must be used where available;

(iii) Predictive models must be appropriate and tailored to the site conditions, composition of the carbon dioxide stream and injection and site conditions over the life of the geologic sequestration project;

(iv) Predictive models must be calibrated using existing information (e.g., at Class I, Class II, or Class V experimental technology well sites) where sufficient data are available;

(v) Reasonably conservative values and modeling assumptions must be used and disclosed to the Director whenever values are estimated on the basis of known, historical information instead of site-specific measurements;

(vi) An analysis must be performed to identify and assess aspects of the alternative post-injection site care timeframe demonstration that contribute significantly to uncertainty. The owner or operator must conduct sensitivity analyses to determine the effect that significant uncertainty may contribute to the modeling demonstration.

(vii) An approved quality assurance and quality control plan must address all aspects of the demonstration; and,

(viii) Any additional criteria required by the Director.

(d) *Notice of intent for site closure.* The owner or operator must notify the Director in writing at least 120 days before site closure. At this time, if any changes have been made to the original post-injection site care and site closure plan, the owner or operator must also provide the revised plan. The Director may allow for a shorter notice period.

(e) After the Director has authorized site closure, the owner or operator must plug all monitoring wells in a manner which will not allow movement of injection or formation fluids that endangers a USDW.

(f) The owner or operator must submit a site closure report to the Director within 90 days of site closure, which must thereafter be retained at a location designated by the Director for 10 years. The report must include:

(1) Documentation of appropriate injection and monitoring well plugging as specified in §146.92 and paragraph (e) of this section. The owner or operator must provide a copy of a survey plat which has been submitted to the local zoning authority designated by the Director. The plat must indicate the location of the injection well relative to permanently surveyed benchmarks. The owner or operator must also submit a copy of the plat to the Regional Administrator of the appropriate EPA Regional Office;

(2) Documentation of appropriate notification and information to such State, local and Tribal authorities that have authority over drilling activities to enable such State, local, and Tribal authorities to impose appropriate conditions on subsequent drilling activities that may penetrate the injection and confining zone(s); and

(3) Records reflecting the nature, composition, and volume of the carbon dioxide stream.

(g) Each owner or operator of a Class VI injection well must record a notation on the deed to the facility property or any other document that is normally examined during title search that will in perpetuity provide any potential purchaser of the property the following information:

(1) The fact that land has been used to sequester carbon dioxide;

(2) The name of the State agency, local authority, and/or Tribe with which the survey plat was filed, as well as the address of the Environmental Protection Agency Regional Office to which it was submitted; and

(3) The volume of fluid injected, the injection zone or zones into which it was injected, and the period over which injection occurred.

(h) The owner or operator must retain for 10 years following site closure, records collected during the post-injection site care period. The owner or operator must deliver the records to the Director at the conclusion of the retention period, and the records must thereafter be retained at a location designated by the Director for that purpose.

§146.94 Emergency and remedial response.

(a) As part of the permit application, the owner or operator must provide the

Director with an emergency and remedial response plan that describes actions the owner or operator must take to address movement of the injection or formation fluids that may cause an endangerment to a USDW during construction, operation, and post-injection site care periods. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.

(b) If the owner or operator obtains evidence that the injected carbon dioxide stream and associated pressure front may cause an endangerment to a USDW, the owner or operator must:

(1) Immediately cease injection;

(2) Take all steps reasonably necessary to identify and characterize any release;

(3) Notify the Director within 24 hours; and

(4) Implement the emergency and remedial response plan approved by the Director.

(c) The Director may allow the operator to resume injection prior to remediation if the owner or operator demonstrates that the injection operation will not endanger USDWs.

(d) The owner or operator shall periodically review the emergency and remedial response plan developed under paragraph (a) of this section. In no case shall the owner or operator review the emergency and remedial response plan less often than once every five years. Based on this review, the owner or operator shall submit an amended emergency and remedial response plan or demonstrate to the Director that no amendment to the emergency and remedial response plan is needed. Any amendments to the emergency and remedial response plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §144.39 or §144.41 of this chapter, as appropriate. Amended plans or demonstrations shall be submitted to the Director as follows:

(1) Within one year of an area of review reevaluation;

(2) Following any significant changes to the facility, such as addition of injection or monitoring wells, on a schedule determined by the Director; or

(3) When required by the Director.

§146.95 Class VI injection depth waiver requirements.

This section sets forth information which an owner or operator seeking a waiver of the Class VI injection depth requirements must submit to the Director; information the Director must consider in consultation with all affected Public Water System Supervision Directors; the procedure for Director—Regional Administrator communication and waiver issuance; and the additional requirements that apply to owners or operators of Class VI wells granted a waiver of the injection depth requirements.

(a) In seeking a waiver of the requirement to inject below the lowermost USDW, the owner or operator must submit a supplemental report concurrent with permit application. The supplemental report must include the following,

(1) A demonstration that the injection zone(s) is/are laterally continuous, is not a USDW, and is not hydraulically connected to USDWs; does not outcrop; has adequate injectivity, volume, and sufficient porosity to safely contain the injected carbon dioxide and formation fluids; and has appropriate geochemistry.

(2) A demonstration that the injection zone(s) is/are bounded by laterally continuous, impermeable confining units above and below the injection zone(s) adequate to prevent fluid movement and pressure buildup outside of the injection zone(s); and that the confining unit(s) is/are free of transmissive faults and fractures. The report shall further characterize the regional fracture properties and contain a demonstration that such fractures will not interfere with injection, serve as conduits, or endanger USDWs.

(3) A demonstration, using computational modeling, that USDWs above and below the injection zone will not be endangered as a result of fluid movement. This modeling should be conducted in conjunction with the area of review determination, as described in §146.84, and is subject to requirements, as described in §146.84(c), and periodic reevaluation, as described in §146.84(e).

(4) A demonstration that well design and construction, in conjunction with the waiver, will ensure isolation of the injectate in lieu of requirements at 146.86(a)(1) and will meet well construction requirements in paragraph (f) of this section.

(5) A description of how the monitoring and testing and any additional plans will be tailored to the geologic sequestration project to ensure protection of USDWs above and below the injection zone(s), if a waiver is granted.

(6) Information on the location of all the public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review.

(7) Any other information requested by the Director to inform the Regional Administrator's decision to issue a waiver.

(b) To inform the Regional Administrator's decision on whether to grant a waiver of the injection depth requirements at §§144.6 of this chapter, 146.5(f), and 146.86(a)(1), the Director must submit, to the Regional Administrator, documentation of the following:

(1) An evaluation of the following information as it relates to siting, construction, and operation of a geologic sequestration project with a waiver:

(i) The integrity of the upper and lower confining units;

(ii) The suitability of the injection zone(s) (e.g., lateral continuity; lack of transmissive faults and fractures; knowledge of current or planned artificial penetrations into the injection zone(s) or formations below the injection zone);

(iii) The potential capacity of the geologic formation(s) to sequester carbon dioxide, accounting for the availability of alternative injection sites;

(iv) All other site characterization data, the proposed emergency and remedial response plan, and a demonstration of financial responsibility;

(v) Community needs, demands, and supply from drinking water resources;

(vi) Planned needs, potential and/or future use of USDWs and non-USDWs in the area;

(vii) Planned or permitted water, hydrocarbon, or mineral resource exploitation potential of the proposed injection formation(s) and other formations both above and below the injection zone to determine if there are any plans to drill through the formation to access resources in or beneath the proposed injection zone(s)/formation(s);

(viii) The proposed plan for securing alternative resources or treating USDW formation waters in the event of contamination related to the Class VI injection activity; and,

(ix) Any other applicable considerations or information requested by the Director.

(2) Consultation with the Public Water System Supervision Directors of all States and Tribes having jurisdiction over lands within the area of review of a well for which a waiver is sought.

(3) Any written waiver-related information submitted by the Public Water System Supervision Director(s) to the (UIC) Director.

(c) Pursuant to requirements at §124.10 of this chapter and concurrent with the Class VI permit application notice process, the Director shall give public notice that a waiver application has been submitted. The notice shall clearly state:

(1) The depth of the proposed injection zone(s);

(2) The location of the injection well(s);

(3) The name and depth of all USDWs within the area of review;

(4) A map of the area of review;

(5) The names of any public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review; and,

(6) The results of UIC-Public Water System Supervision consultation required under paragraph (b)(2) of this section.

(d) Following public notice, the Director shall provide all information received through the waiver application process to the Regional Administrator. Based on the information provided, the Regional Administrator shall provide written concurrence or non-concurrence regarding waiver issuance.

(1) If the Regional Administrator determines that additional information is required to support a decision, the Director shall provide the information. At his or her discretion, the Regional Administrator may require that public

notice of the new information be initiated.

(2) In no case shall a Director of a State-approved program issue a waiver without receipt of written concurrence from the Regional Administrator.

(e) If a waiver is issued, within 30 days of waiver issuance, EPA shall post the following information on the Office of Water's Web site:

(1) The depth of the proposed injection zone(s);

(2) The location of the injection well(s);

(3) The name and depth of all USDWs within the area of review;

(4) A map of the area of review;

(5) The names of any public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review; and

(6) The date of waiver issuance.

(f) Upon receipt of a waiver of the requirement to inject below the lowermost USDW for geologic sequestration, the owner or operator of the Class VI well must comply with:

(1) All requirements at §§146.84, 146.85, 146.87, 146.88, 146.89, 146.91, 146.92, and 146.94;

(2) All requirements at §146.86 with the following modified requirements:

(i) The owner or operator must ensure that Class VI wells with a waiver are constructed and completed to prevent movement of fluids into any unauthorized zones including USDWs, in lieu of requirements at §146.86(a)(1).

(ii) The casing and cementing program must be designed to prevent the movement of fluids into any unauthorized zones including USDWs in lieu of requirements at §146.86(b)(1).

(iii) The surface casing must extend through the base of the nearest USDW directly above the injection zone and be cemented to the surface; or, at the Director's discretion, another formation above the injection zone and below the nearest USDW above the injection zone.

(3) All requirements at §146.90 with the following modified requirements:

(i) The owner or operator shall monitor the groundwater quality, geochemical changes, and pressure in the first USDWs immediately above and below the injection zone(s); and in any other formations at the discretion of the Director.

(ii) Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using direct methods to monitor for pressure changes in the injection zone(s); and, indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines, based on site-specific geology, that such methods are not appropriate.

(4) All requirements at §146.93 with the following, modified post-injection site care monitoring requirements:

(i) The owner or operator shall monitor the groundwater quality, geochemical changes and pressure in the first USDWs immediately above and below the injection zone; and in any other formations at the discretion of the Director.

(ii) Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using direct methods in the injection zone(s); and indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines based on site-specific geology, that such methods are not appropriate;

(5) Any additional requirements requested by the Director designed to ensure protection of USDWs above and below the injection zone(s).

PART 147—STATE, TRIBAL, AND EPA-ADMINISTERED UNDERGROUND INJECTION CONTROL PROGRAMS

Subpart A—General Provisions

Sec.

Subpart B—Alabama

section 3007(b) of RCRA and EPA regulations implementing the Freedom of Information Act and section 3007(b), part 2 of this chapter, as applicable.

(b) Any person who submits information to EPA in accordance with parts 260 through 266 and 268 of this chapter may assert a claim of business confidentiality covering part or all of that information by following the procedures set forth in §2.203(b) of this chapter. Information covered by such a claim will be disclosed by EPA only to the extent, and by means of the procedures, set forth in part 2, subpart B, of this chapter except that information required by §§262.53(a) and 262.83 that is submitted in a notification of intent to export a hazardous waste will be provided to the U.S. Department of State and the appropriate authorities in the transit and receiving or importing countries regardless of any claims of confidentiality. However, if no such claim accompanies the information when it is received by EPA, it may be made available to the public without further notice to the person submitting it.

[45 FR 33073, May 19, 1980, as amended at 51 FR 28682, Aug. 8, 1986; 51 FR 40636, Nov. 7, 1986; 61 FR 16309, Apr. 12, 1996]

§ 260.3 Use of number and gender.

As used in parts 260 through 265 and 268 of this chapter:

(a) Words in the masculine gender also include the feminine and neuter genders; and

(b) Words in the singular include the plural; and

(c) Words in the plural include the singular.

[45 FR 33073, May 19, 1980, as amended at 51 FR 40636, Nov. 7, 1986]

Subpart B—Definitions

§ 260.10 Definitions.

When used in parts 260 through 273 of this chapter, the following terms have the meanings given below:

Above ground tank means a device meeting the definition of "tank" in §260.10 and that is situated in such a way that the entire surface area of the tank is completely above the plane of the adjacent surrounding surface and the entire surface area of the tank (including the tank bottom) is able to be visually inspected.

Act or *RCRA* means the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended, 42 U.S.C. section 6901 *et seq.*

Active life of a facility means the period from the initial receipt of hazardous waste at the facility until the Regional Administrator receives certification of final closure.

Active portion means that portion of a facility where treatment, storage, or disposal operations are being or have been conducted after the effective date of part 261 of this chapter and which is not a closed portion. (See also "closed portion" and "inactive portion".)

Administrator means the Administrator of the Environmental Protection Agency, or his designee.

Ancillary equipment means any device including, but not limited to, such devices as piping, fittings, flanges, valves, and pumps, that is used to distribute, meter, or control the flow of hazardous waste from its point of generation to a storage or treatment tank(s), between hazardous waste storage and treatment tanks to a point of disposal onsite, or to a point of shipment for disposal off-site.

Aquifer means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of ground water to wells or springs.

Authorized representative means the person responsible for the overall operation of a facility or an operational unit (i.e., part of a facility), e.g., the plant manager, superintendent or person of equivalent responsibility.

Battery means a device consisting of one or more electrically connected electrochemical cells which is designed to receive, store, and deliver electric energy. An electrochemical cell is a system consisting of an anode, cathode, and an electrolyte, plus such connections (electrical and mechanical) as may be needed to allow the cell to deliver or receive electrical energy. The term battery also includes an intact, unbroken battery from which the electrolyte has been removed.

unit from which waste is removed during closure, if the subsequent reuse solely involves the disposal of waste from that unit and other closing units or corrective action areas at the facility, in accordance with an approved closure plan or EPA or State approved corrective action.

Representative sample means a sample of a universe or whole (e.g., waste pile, lagoon, ground water) which can be expected to exhibit the average properties of the universe or whole.

Run-off means any rainwater, leachate, or other liquid that drains over land from any part of a facility.

Run-on means any rainwater, leachate, or other liquid that drains over land onto any part of a facility.

Saturated zone or *zone of saturation* means that part of the earth's crust in which all voids are filled with water.

Sludge means any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility exclusive of the treated effluent from a wastewater treatment plant.

Sludge dryer means any enclosed thermal treatment device that is used to dehydrate sludge and that has a maximum total thermal input, excluding the heating value of the sludge itself, of 2,500 Btu/lb of sludge treated on a wet-weight basis.

Small Quantity Generator means a generator who generates less than 1000 kg of hazardous waste in a calendar month.

Solid waste means a solid waste as defined in §261.2 of this chapter.

Sorbent means a material that is used to soak up free liquids by either adsorption or absorption, or both. *Sorb* means to either adsorb or absorb, or both.

Staging pile means an accumulation of solid, non-flowing remediation waste (as defined in this section) that is not a containment building and that is used only during remedial operations for temporary storage at a facility. Staging piles must be designated by the Director according to the requirements of 40 CFR 264.554.

State means any of the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

Storage means the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.

Sump means any pit or reservoir that meets the definition of tank and those troughs/trenches connected to it that serve to collect hazardous waste for transport to hazardous waste storage, treatment, or disposal facilities; except that as used in the landfill, surface impoundment, and waste pile rules, "sump" means any lined pit or reservoir that serves to collect liquids drained from a leachate collection and removal system or leak detection system for subsequent removal from the system.

Surface impoundment or *impoundment* means a facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling, and aeration pits, ponds, and lagoons.

Tank means a stationary device, designed to contain an accumulation of hazardous waste which is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) which provide structural support.

Tank system means a hazardous waste storage or treatment tank and its associated ancillary equipment and containment system.

TEQ means toxicity equivalence, the international method of relating the toxicity of various dioxin/furan congeners to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin.

Thermal treatment means the treatment of hazardous waste in a device which uses elevated temperatures as the primary means to change the chemical, physical, or biological character or composition of the hazardous waste. Examples of thermal treatment processes are incineration, molten salt,

AUTHORITY: 42 U.S.C. 6905, 6912(a), 6921, 6922, 6924(y) and 6938.

SOURCE: 45 FR 33119, May 19, 1980, unless otherwise noted.

Subpart A—General

§ 261.1 Purpose and scope.

(a) This part identifies those solid wastes which are subject to regulation as hazardous wastes under parts 262 through 265, 268, and parts 270, 271, and 124 of this chapter and which are subject to the notification requirements of section 3010 of RCRA. In this part:

(1) Subpart A defines the terms "solid waste" and "hazardous waste", identifies those wastes which are excluded from regulation under parts 262 through 266, 268 and 270 and establishes special management requirements for hazardous waste produced by conditionally exempt small quantity generators and hazardous waste which is recycled.

(2) Subpart B sets forth the criteria used by EPA to identify characteristics of hazardous waste and to list particular hazardous wastes.

(3) Subpart C identifies characteristics of hazardous waste.

(4) Subpart D lists particular hazardous wastes.

(b)(1) The definition of solid waste contained in this part applies only to wastes that also are hazardous for purposes of the regulations implementing subtitle C of RCRA. For example, it does not apply to materials (such as non-hazardous scrap, paper, textiles, or rubber) that are not otherwise hazardous wastes and that are recycled.

(2) This part identifies only some of the materials which are solid wastes and hazardous wastes under sections 3007, 3013, and 7003 of RCRA. A material which is not defined as a solid waste in this part, or is not a hazardous waste identified or listed in this part, is still a solid waste and a hazardous waste for purposes of these sections if:

(i) In the case of sections 3007 and 3013, EPA has reason to believe that the material may be a solid waste within the meaning of section 1004(27) of RCRA and a hazardous waste within the meaning of section 1004(5) of RCRA; or

(ii) In the case of section 7003, the statutory elements are established.

(c) For the purposes of §§ 261.2 and 261.6:

(1) A "spent material" is any material that has been used and as a result of contamination can no longer serve the purpose for which it was produced without processing;

(2) "Sludge" has the same meaning used in § 260.10 of this chapter;

(3) A "by-product" is a material that is not one of the primary products of a

production process and is not solely or separately produced by the production process. Examples are process residues such as slags or distillation column bottoms. The term does not include a co-product that is produced for the general public's use and is ordinarily used in the form it is produced by the process.

(4) A material is "reclaimed" if it is processed to recover a usable product, or if it is regenerated. Examples are recovery of lead values from spent batteries and regeneration of spent solvents. In addition, for purposes of §§261.2(a)(2)(ii), 261.4(a)(23), and 261.4(a)(24) smelting, melting and refining furnaces are considered to be solely engaged in metals reclamation if the metal recovery from the hazardous secondary materials meets the same requirements as those specified for metals recovery from hazardous waste found in §266.100(d)(1)–(3) of this chapter, and if the residuals meet the requirements specified in §266.112 of this chapter.

(5) A material is "used or reused" if it is either:

(i) Employed as an ingredient (including use as an intermediate) in an industrial process to make a product (for example, distillation bottoms from one process used as feedstock in another process). However, a material will not satisfy this condition if distinct components of the material are recovered as separate end products (as when metals are recovered from metal-containing secondary materials); or

(ii) Employed in a particular function or application as an effective substitute for a commercial product (for example, spent pickle liquor used as phosphorous precipitant and sludge conditioner in wastewater treatment).

(6) "Scrap metal" is bits and pieces of metal parts (e.g.,) bars, turnings, rods, sheets, wire) or metal pieces that may be combined together with bolts or soldering (e.g., radiators, scrap automobiles, railroad box cars), which when worn or superfluous can be recycled.

(7) A material is "recycled" if it is used, reused, or reclaimed.

(8) A material is "accumulated speculatively" if it is accumulated before being recycled. A material is not accumulated speculatively, however, if the person accumulating it can show that the material is potentially recyclable and has a feasible means of being recycled; and that—during the calendar year (commencing on January 1)—the amount of material that is recycled, or transferred to a different site for recycling, equals at least 75 percent by weight or volume of the amount of that material accumulated at the beginning of the period. In calculating the percentage of turnover, the 75 percent requirement is to be applied to each material of the same type (e.g., slags from a single smelting process) that is recycled in the same way (*i.e.*, from which the same material is recovered or that is used in the same way). Materials accumulating in units that would be exempt from regulation under §261.4(c) are not to be included in making the calculation. (Materials that are already defined as solid wastes also are not to be included in making the calculation.) Materials are no longer in this category once they are removed from accumulation for recycling, however.

(9) "Excluded scrap metal" is processed scrap metal, unprocessed home scrap metal, and unprocessed prompt scrap metal.

(10) "Processed scrap metal" is scrap metal which has been manually or physically altered to either separate it into distinct materials to enhance economic value or to improve the handling of materials. Processed scrap metal includes, but is not limited to scrap metal which has been baled, shredded, sheared, chopped, crushed, flattened, cut, melted, or separated by metal type (i.e., sorted), and, fines, drosses and related materials which have been agglomerated. (Note: shredded circuit boards being sent for recycling are not considered processed scrap metal. They are covered under the exclusion from the definition of solid waste for shredded circuit boards being recycled (§261.4(a)(14)).

(11) "Home scrap metal" is scrap metal as generated by steel mills, foundries, and refineries such as turnings, cuttings, punchings, and borings.

(12) "Prompt scrap metal" is scrap metal as generated by the metal working/fabrication industries and includes

such scrap metal as turnings, cuttings, punchings, and borings. Prompt scrap is also known as industrial or new scrap metal.

[45 FR 33119, May 19, 1980, as amended at 48 FR 14293, Apr. 1, 1983; 50 FR 663, Jan. 4, 1985; 51 FR 10174, Mar. 24, 1986; 51 FR 40636, Nov. 7, 1986; 62 FR 26018, May 12, 1997; 73 FR 64760, Oct. 30, 2008; 75 FR 13001, Mar. 18, 2010]

§ 261.2 Definition of solid waste.

(a)(1) A *solid waste* is any discarded material that is not excluded under § 261.4(a) or that is not excluded by a variance granted under §§ 260.30 and 260.31 or that is not excluded by a non-waste determination under §§ 260.30 and 260.34.

(2)(i) A *discarded material* is any material which is:

(A) Abandoned, as explained in paragraph (b) of this section; or

(B) Recycled, as explained in paragraph (c) of this section; or

(C) Considered inherently waste-like, as explained in paragraph (d) of this section; or

(D) A military munition identified as a solid waste in § 266.202.

(ii) A hazardous secondary material is not discarded if it is generated and reclaimed under the control of the generator as defined in § 260.10, it is not speculatively accumulated as defined in § 261.1(c)(8), it is handled only in non-land-based units and is contained in such units, it is generated and reclaimed within the United States and its territories, it is not otherwise subject to material-specific management conditions under § 261.4(a) when reclaimed, it is not a spent lead acid battery (see § 266.80 and § 273.2), it does not meet the listing description for K171 or K172 in § 261.32, and the reclamation of the material is legitimate, as specified under § 260.43. (See also the notification requirements of § 260.42). (For hazardous secondary materials managed in land-based units, see § 261.4(a)(23)).

(b) Materials are solid waste if they are *abandoned* by being:

(1) Disposed of; or

(2) Burned or incinerated; or

(3) Accumulated, stored, or treated (but not recycled) before or in lieu of being abandoned by being disposed of, burned, or incinerated.

(c) Materials are solid wastes if they are *recycled*—or accumulated, stored, or treated before recycling—as specified in paragraphs (c)(1) through (4) of this section.

(1) *Used in a manner constituting disposal.* (i) Materials noted with a "*" in Column 1 of Table 1 are solid wastes when they are:

(A) Applied to or placed on the land in a manner that constitutes disposal; or

(B) Used to produce products that are applied to or placed on the land or are otherwise contained in products that are applied to or placed on the land (in which cases the product itself remains a solid waste).

(ii) However, commercial chemical products listed in § 261.33 are not solid wastes if they are applied to the land and that is their ordinary manner of use.

(2) *Burning for energy recovery.* (i) Materials noted with a "*" in column 2 of Table 1 are solid wastes when they are:

(A) Burned to recover energy;

(B) Used to produce a fuel or are otherwise contained in fuels (in which cases the fuel itself remains a solid waste).

(ii) However, commercial chemical products listed in § 261.33 are not solid wastes if they are themselves fuels.

(3) *Reclaimed.* Materials noted with a "—" in column 3 of Table 1 are not solid wastes when reclaimed. Materials noted with an "*" in column 3 of Table 1 are solid wastes when reclaimed unless they meet the requirements of §§ 261.2(a)(2)(ii), or 261.4(a)(17), or 261.4(a)(23), or 261.4(a)(24) or 261.4(a)(25).

(4) *Accumulated speculatively.* Materials noted with a "*" in column 4 of Table 1 are solid wastes when accumulated speculatively.

TABLE 1

	Use constituting disposal (§261.2(c)(1))	Energy recovery/ fuel (§261.2(c)(2))	Reclamation (261.2(c)(3)), except as provided in §§261.2(a)(2)(ii), 261.4(a)(17), 261.4(a)(23), 261.4(a)(24), or 261.4(a)(25)	Speculative accumulation (§261.2(c)(4))
	1	2	3	4
Spent Materials	(*)	(*)	(*)	(*)
Sludges (listed in 40 CFR Part 261.31 or 261.32)	(*)	(*)	(*)	(*)
Sludges exhibiting a characteristic of hazardous waste	(*)	(*)	—	(*)
By-products (listed in 40 CFR 261.31 or 261.32)	(*)	(*)	(*)	(*)
By-products exhibiting a characteristic of hazardous waste	(*)	(*)	—	(*)
Commercial chemical products listed in 40 CFR 261.33	(*)	(*)	—	—
Scrap metal that is not excluded under §261.4(a)(13)	(*)	(*)	(*)	(*)

Note: The terms "spent materials," "sludges," "by-products," and "scrap metal" and "processed scrap metal" are defined in §261.1.

(d) *Inherently waste-like materials.* The following materials are solid wastes when they are recycled in any manner:

(1) Hazardous Waste Nos. F020, F021 (unless used as an ingredient to make a product at the site of generation), F022, F023, F026, and F028.

(2) Secondary materials fed to a halogen acid furnace that exhibit a characteristic of a hazardous waste or are listed as a hazardous waste as defined in subparts C or D of this part, except for brominated material that meets the following criteria:

(i) The material must contain a bromine concentration of at least 45%; and

(ii) The material must contain less than a total of 1% of toxic organic compounds listed in appendix VIII; and

(iii) The material is processed continually on-site in the halogen acid furnace via direct conveyance (hard piping).

(3) The Administrator will use the following criteria to add wastes to that list:

(i)(A) The materials are ordinarily disposed of, burned, or incinerated; or

(B) The materials contain toxic constituents listed in appendix VIII of part 261 and these constituents are not ordinarily found in raw materials or products for which the materials substitute (or are found in raw materials or products in smaller concentrations) and are not used or reused during the recycling process; and

(ii) The material may pose a substantial hazard to human health and the environment when recycled.

(e) *Materials that are not solid waste when recycled.* (1) Materials are not solid wastes when they can be shown to be recycled by being:

(i) Used or reused as ingredients in an industrial process to make a product, provided the materials are not being reclaimed; or

(ii) Used or reused as effective substitutes for commercial products; or

(iii) Returned to the original process from which they are generated, without first being reclaimed or land disposed. The material must be returned as a substitute for feedstock materials. In cases where the original process to which the material is returned is a secondary process, the materials must be managed such that there is no placement on the land. In cases where the materials are generated and reclaimed within the primary mineral processing industry, the conditions of the exclusion found at §261.4(a)(17) apply rather than this paragraph.

(2) The following materials are solid wastes, even if the recycling involves use, reuse, or return to the original process (described in paragraphs (e)(1)(i) through (iii) of this section):

(i) Materials used in a manner constituting disposal, or used to produce products that are applied to the land; or

(ii) Materials burned for energy recovery, used to produce a fuel, or contained in fuels; or

(iii) Materials accumulated speculatively; or

(iv) Materials listed in paragraphs (d)(1) and (d)(2) of this section.

(f) *Documentation of claims that materials are not solid wastes or are conditionally exempt from regulation.* Respondents in actions to enforce regulations implementing subtitle C of RCRA who raise a claim that a certain material is not a solid waste, or is conditionally exempt from regulation, must demonstrate that there is a known market or disposition for the material, and that they meet the terms of the exclusion or exemption. In doing so, they must provide appropriate documentation (such as contracts showing that a second person uses the material as an ingredient in a production process) to demonstrate that the material is not a waste, or is exempt from regulation. In addition, owners or operators of facilities claiming that they actually are recycling materials must show that they have the necessary equipment to do so.

[50 FR 664, Jan. 4, 1985, as amended at 50 FR 33542, Aug. 20, 1985; 56 FR 7206, Feb. 21, 1991; 56 FR 32688, July 17, 1991; 56 FR 42512, Aug. 27, 1991; 57 FR 38564, Aug. 25, 1992; 59 FR 48042, Sept. 19, 1994; 62 FR 6651, Feb. 12, 1997; 62 FR 26019, May 12, 1997; 63 FR 28636, May 26, 1998; 64 FR 24513, May 11, 1999; 67 FR 11253, Mar. 13, 2002; 71 FR 40258, July 14, 2006; 73 FR 64760, Oct. 30, 2008; 75 FR 13001, Mar. 18, 2010]

§ 261.3 Definition of hazardous waste.

(a) A solid waste, as defined in § 261.2, is a hazardous waste if:

(1) It is not excluded from regulation as a hazardous waste under § 261.4(b); and

(2) It meets any of the following criteria:

(i) It exhibits any of the characteristics of hazardous waste identified in subpart C of this part. However, any mixture of a waste from the extraction, beneficiation, and processing of ores and minerals excluded under § 261.4(b)(7) and any other solid waste exhibiting a characteristic of hazardous waste under subpart C is a hazardous waste only if it exhibits a characteristic that would not have been exhibited by the excluded waste alone if such mixture had not occurred, or if it continues to exhibit any of the characteristics exhibited by the non-excluded wastes prior to mixture. Further, for the purposes of applying the Toxicity Characteristic to such mixtures, the mixture is also a hazardous waste if it exceeds the maximum concentration for any contaminant listed in table 1 to § 261.24 that would not have been exceeded by the excluded waste alone if the mixture had not occurred or if it continues to exceed the maximum concentration for any contaminant exceeded by the nonexempt waste prior to mixture.

(ii) It is listed in subpart D of this part and has not been excluded from the lists in subpart D of this part under §§ 260.20 and 260.22 of this chapter.

(iii) [Reserved]

(iv) It is a mixture of solid waste and one or more hazardous wastes listed in subpart D of this part and has not been excluded from paragraph (a)(2) of this section under §§ 260.20 and 260.22, paragraph (g) of this section, or paragraph (h) of this section; however, the following mixtures of solid wastes and hazardous wastes listed in subpart D of this part are not hazardous wastes (except by application of paragraph (a)(2)(i) or (ii) of this section) if the generator can demonstrate that the mixture consists of wastewater the discharge of which is subject to regulation under either section 402 or section 307(b) of the Clean Water Act (including wastewater at facilities which have eliminated the discharge of wastewater) and;

(A) One or more of the following spent solvents listed in § 261.31—benzene, carbon tetrachloride, tetrachloroethylene, trichloroethylene or the scrubber waters derived-from the combustion of these spent solvents—*Provided,* That the maximum total weekly usage of these solvents (other than the amounts that can be demonstrated not to be discharged to wastewater) divided by the average weekly flow of wastewater into the headworks of the facility's wastewater treatment or pretreatment system does not exceed 1 part per million, OR the

Subpart C—Characteristics of Hazardous Waste

§ 261.20 General.

(a) A solid waste, as defined in § 261.2, which is not excluded from regulation as a hazardous waste under § 261.4(b), is a hazardous waste if it exhibits any of the characteristics identified in this subpart.

[*Comment:* § 262.11 of this chapter sets forth the generator's responsibility to determine whether his waste exhibits one or more of the characteristics identified in this subpart]

(b) A hazardous waste which is identified by a characteristic in this subpart is assigned every EPA Hazardous Waste Number that is applicable as set forth in this subpart. This number must be used in complying with the notification requirements of section 3010 of the Act and all applicable record-keeping and reporting requirements under parts 262 through 265, 268, and 270 of this chapter.

(c) For purposes of this subpart, the Administrator will consider a sample obtained using any of the applicable sampling methods specified in appendix I to be a representative sample within the meaning of part 260 of this chapter.

[*Comment:* Since the appendix I sampling methods are not being formally adopted by the Administrator, a person who desires to employ an alternative sampling method is not required to demonstrate the equivalency of his method under the procedures set forth in §§ 260.20 and 260.21.]

[45 FR 33119, May 19, 1980, as amended at 51 FR 40636, Nov. 7, 1986; 55 FR 22684, June 1, 1990; 56 FR 3876, Jan. 31, 1991]

§ 261.21 Characteristic of ignitability.

(a) A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:

(1) It is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume and has flash point less than 60 °C (140 °F), as determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D 93–79 or D 93–80 (incorporated by reference, see § 260.11), or a Setaflash Closed Cup Tester, using the test method specified in ASTM Standard D 3278–78 (incorporated by reference, see § 260.11).

(2) It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.

(3) It is an ignitable compressed gas.

(i) The term "compressed gas" shall designate any material or mixture having in the container an absolute pressure exceeding 40 p.s.i. at 70 °F or, regardless of the pressure at 70 °F, having an absolute pressure exceeding 104 p.s.i. at 130 °F; or any liquid flammable material having a vapor pressure exceeding 40 p.s.i. absolute at 100 °F as determined by ASTM Test D–323.

(ii) A compressed gas shall be characterized as ignitable if any one of the following occurs:

(A) Either a mixture of 13 percent or less (by volume) with air forms a flammable mixture or the flammable range with air is wider than 12 percent regardless of the lower limit. These limits shall be determined at atmospheric temperature and pressure. The method of sampling and test procedure shall be acceptable to the Bureau of Explosives and approved by the director, Pipeline and Hazardous Materials Technology, U.S. Department of Transportation (see Note 2).

(B) Using the Bureau of Explosives' Flame Projection Apparatus (see Note 1), the flame projects more than 18 inches beyond the ignition source with valve opened fully, or, the flame flashes back and burns at the valve with any degree of valve opening.

(C) Using the Bureau of Explosives' Open Drum Apparatus (see Note 1), there is any significant propagation of flame away from the ignition source.

(D) Using the Bureau of Explosives' Closed Drum Apparatus (see Note 1), there is any explosion of the vapor-air mixture in the drum.

(4) It is an oxidizer. An oxidizer for the purpose of this subchapter is a substance such as a chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter (see Note 4).

(i) An organic compound containing the bivalent -O-O- structure and which may be considered a derivative of hydrogen peroxide where one or more of the hydrogen atoms have been replaced by organic radicals must be classed as an organic peroxide unless:

(A) The material meets the definition of a Class A explosive or a Class B explosive, as defined in §261.23(a)(8), in which case it must be classed as an explosive,

(B) The material is forbidden to be offered for transportation according to 49 CFR 172.101 and 49 CFR 173.21,

(C) It is determined that the predominant hazard of the material containing an organic peroxide is other than that of an organic peroxide, or

(D) According to data on file with the Pipeline and Hazardous Materials Safety Administration in the U.S. Department of Transportation (see Note 3), it has been determined that the material does not present a hazard in transportation.

(b) A solid waste that exhibits the characteristic of ignitability has the EPA Hazardous Waste Number of D001.

NOTE 1: A description of the Bureau of Explosives' Flame Projection Apparatus, Open Drum Apparatus, Closed Drum Apparatus, and method of tests may be procured from the Bureau of Explosives.

NOTE 2: As part of a U.S. Department of Transportation (DOT) reorganization, the Office of Hazardous Materials Technology (OHMT), which was the office listed in the 1980 publication of 49 CFR 173.300 for the purposes of approving sampling and test procedures for a flammable gas, ceased operations on February 20, 2005. OHMT programs have moved to the Pipeline and Hazardous Materials Safety Administration (PHMSA) in the DOT.

NOTE 3: As part of a U.S. Department of Transportation (DOT) reorganization, the Research and Special Programs Administration (RSPA), which was the office listed in the 1980 publication of 49 CFR 173.151a for the purposes of determining that a material does not present a hazard in transport, ceased operations on February 20, 2005. RSPA programs have moved to the Pipeline and Hazardous Materials Safety Administration (PHMSA) in the DOT.

NOTE 4: The DOT regulatory definition of an oxidizer was contained in §173.151 of 49 CFR, and the definition of an organic peroxide was contained in paragraph 173.151a. An organic peroxide is a type of oxidizer.

[45 FR 33119, May 19, 1980, as amended at 46 FR 35247, July 7, 1981; 55 FR 22684, June 1, 1990; 70 FR 34561, June 14, 2005; 71 FR 40259, July 14, 2006]

§261.22 Characteristic of corrosivity.

(a) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

(1) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using Method 9040C in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW–846, as incorporated by reference in §260.11 of this chapter.

(2) It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55 °C (130 °F) as determined by Method 1110A in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW–846, and as incorporated by reference in §260.11 of this chapter.

(b) A solid waste that exhibits the characteristic of corrosivity has the EPA Hazardous Waste Number of D002.

[45 FR 33119, May 19, 1980, as amended at 46 FR 35247, July 7, 1981; 55 FR 22684, June 1, 1990; 58 FR 46049, Aug. 31, 1993; 70 FR 34561, June 14, 2005]

§261.23 Characteristic of reactivity.

(a) A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has *any* of the following properties:

(1) It is normally unstable and readily undergoes violent change without detonating.

(2) It reacts violently with water.

(3) It forms potentially explosive mixtures with water.

(4) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

(5) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

(6) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

(7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

(8) It is a forbidden explosive as defined in 49 CFR 173.54, or is a Division 1.1, 1.2 or 1.3 explosive as defined in 49 CFR 173.50 and 173.53.

(b) A solid waste that exhibits the characteristic of reactivity has the EPA Hazardous Waste Number of D003.

[45 FR 33119, May 19, 1980, as amended at 55 FR 22684, June 1, 1990; 75 FR 13002, Mar. 18, 2010]

§ 261.24 Toxicity characteristic.

(a) A solid waste (except manufactured gas plant waste) exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW–846, as incorporated by reference in § 260.11 of this chapter, the extract from a representative sample of the waste contains any of the contaminants listed in table 1 at the concentration equal to or greater than the respective value given in that table. Where the waste contains less than 0.5 percent filterable solids, the waste itself, after filtering using the methodology outlined in Method 1311, is considered to be the extract for the purpose of this section.

(b) A solid waste that exhibits the characteristic of toxicity has the EPA Hazardous Waste Number specified in Table 1 which corresponds to the toxic contaminant causing it to be hazardous.

TABLE 1—MAXIMUM CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC

EPA HW No.[1]	Contaminant	CAS No.[2]	Regulatory Level (mg/L)
D004	Arsenic	7440–38–2	5.0
D005	Barium	7440–39–3	100.0
D018	Benzene	71–43–2	0.5
D006	Cadmium	7440–43–9	1.0
D019	Carbon tetrachloride	56–23–5	0.5
D020	Chlordane	57–74–9	0.03
D021	Chlorobenzene	108–90–7	100.0
D022	Chloroform	67–66–3	6.0
D007	Chromium	7440–47–3	5.0
D023	o-Cresol	95–48–7	[4]200.0
D024	m-Cresol	108–39–4	[4]200.0
D025	p-Cresol	106–44–5	[4]200.0
D026	Cresol		[4]200.0
D016	2,4-D	94–75–7	10.0
D027	1,4-Dichlorobenzene	106–46–7	7.5
D028	1,2-Dichloroethane	107–06–2	0.5
D029	1,1-Dichloroethylene	75–35–4	0.7
D030	2,4-Dinitrotoluene	121–14–2	[3]0.13
D012	Endrin	72–20–8	0.02
D031	Heptachlor (and its epoxide).	76–44–8	0.008
D032	Hexachlorobenzene	118–74–1	[3]0.13
D033	Hexachlorobutadiene	87–68–3	0.5
D034	Hexachloroethane	67–72–1	3.0
D008	Lead	7439–92–1	5.0
D013	Lindane	58–89–9	0.4
D009	Mercury	7439–97–6	0.2
D014	Methoxychlor	72–43–5	10.0
D035	Methyl ethyl ketone	78–93–3	200.0
D036	Nitrobenzene	98–95–3	2.0
D037	Pentrachlorophenol	87–86–5	100.0
D038	Pyridine	110–86–1	[3]5.0
D010	Selenium	7782–49–2	1.0
D011	Silver	7440–22–4	5.0
D039	Tetrachloroethylene	127–18–4	0.7
D015	Toxaphene	8001–35–2	0.5
D040	Trichloroethylene	79–01–6	0.5
D041	2,4,5-Trichlorophenol	95–95–4	400.0
D042	2,4,6-Trichlorophenol	88–06–2	2.0
D017	2,4,5-TP (Silvex)	93–72–1	1.0
D043	Vinyl chloride	75–01–4	0.2

[1] Hazardous waste number.
[2] Chemical abstracts service number.
[3] Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.
[4] If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/l.
[4] If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/l.

[55 FR 11862, Mar. 29, 1990, as amended at 55 FR 22684, June 1, 1990; 55 FR 26987, June 29, 1990; 58 FR 46049, Aug. 31, 1993; 67 FR 11254, Mar. 13, 2002; 71 FR 40259, July 14, 2006]

Subpart D—Lists of Hazardous Wastes

§ 261.30 General.

(a) A solid waste is a hazardous waste if it is listed in this subpart, unless it has been excluded from this list under §§ 260.20 and 260.22.

(b) The Administrator will indicate his basis for listing the classes or types of wastes listed in this subpart by employing one or more of the following Hazard Codes:

Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
Toxicity Characteristic Waste	(E)

No. 14-1046 (and consolidated case)

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

CARBON SEQUESTRATION COUNCIL, *et al.*,

Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *et al.*,

Respondents.

ON PETITION FOR REVIEW OF FINAL REGULATIONS PROMULGATED BY THE ENVIRONMENTAL PROTECTION AGENCY

OPENING BRIEF OF PETITIONERS CARBON SEQUESTRATION COUNCIL, SOUTHERN COMPANY SERVICES, INC., AND AMERICAN PETROLEUM INSTITUTE

ADDENDUM 2:

ADDITIONAL EVIDENCE OF PETITIONERS' STANDING

TABLE OF CONTENTS

August 25, 2014

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DECLARATION OF RICHARD A. ESPOSITO

I, Richard A. Esposito, declare under penalty of perjury:

1. My name is Richard A. Esposito, and I reside at 5311 Woodford Drive, Birmingham, Alabama 35242. I have personal knowledge of the facts and descriptions presented herein.

2. I am a professional geologist, holding the following degrees: B.S. in Geology, M.S. in Geology, M.S. in Environmental Management, PhD in Interdisciplinary Engineering. I also hold Professional Geologist (P.G.)

registrations in Alabama, Mississippi, and Florida. I also serve on the Alabama Board of Licensing of Professional Geologists and serve as the President of the Alabama Geologic Society.

3. From 1991 until the present, I have been employed by Southern Company Services, Inc. (SCS). SCS is the system service company providing specialized services, including regulatory and engineering services, to Southern Company and its subsidiary companies. My present title is Principal Research Geologist. My responsibilities include serving as the technical and regulatory lead for research and development activities related to carbon capture utilization and storage. Projects include numerous pilot and demonstration scale injection programs, Department of Energy Southeast Regional Carbon Sequestration Partnership (SECARB) projects, source-sink matching and capacity assessments, and site characterization drilling projects. Prior to my current position, I was employed by SCS as Senior Engineering Geologist. In that position my job responsibilities and professional activities included: project management of groundwater quality studies, soil and groundwater contamination assessment; technology selection and design of groundwater monitoring and remediation programs for electric generating facilities, including interface with appropriate regulatory agencies; water-supply well evaluations and siting; electric generating facility decommissioning; geologic resource evaluations and mineral lease contracts with

surface minerals, carbonate rocks, coalbed methane, and conventional oil related to electric power generation or mineral reserves on company lands; geologic carbon sequestration and enhanced energy recovery with carbon dioxide; preparation of electric generating facility siting studies; and preparation of studies related to disposal areas for electric generation by-products such as ash and gypsum.

4. In addition to SCS, Southern Company is the parent company of and owns all of the common stock of Alabama Power Company, Georgia Power Company, Gulf Power Company, and Mississippi Power Company. These operating companies supply energy-related services, including electric power, in the states of Alabama, Georgia, Florida, and Mississippi, respectively. Additionally, Southern Company owns all of the common stock of Southern Power Company, a public utility operating company that constructs, acquires, owns, and manages generation assets and sells electricity at market-based rates in the wholesale market.

5. SCS acts as agent for the Operating Companies with respect to the execution and administration of certain contracts and in proceedings before, *inter alia*, the Environmental Protection Agency ("EPA"). SCS also provides services in connection with the coordination and oversight of the Operating Companies' system-wide operations, including installation and operation of environmental systems, including carbon capture systems, which are the subject of the EPA

regulations at issue. On behalf of the Operating Companies, SCS is involved in many research and demonstration projects involving carbon capture and sequestration (CCS) technologies. Carbon dioxide gas is a combustion byproduct. SCS is researching—with the federal government and other partners—how to capture, transport, use and store carbon dioxide gas from power plants. Such activity would keep the gas from being discharged into the atmosphere and put it to productive use, such as enhanced oil and gas recovery.

6. CCS can be described as a multi-step process, beginning with the capture of the carbon dioxide gas from fossil fuel combustion, compression of the gas into supercritical form, transportation by pipeline to a point of injection underground for purposes of geologic sequestration (GS). The sequestration, or storage, step is the process of injecting the supercritical carbon dioxide streams captured from emission sources into deep subsurface rock formations, which isolates the carbon dioxide gas permanently from the atmosphere. GS is a key component of CCS, which is a set of climate change mitigation technologies.

7. SCS has installed equipment to capture carbon dioxide from a twenty-five megawatt (MW) slip stream at the Alabama Power Company's James M. Barry Electric Generating Plant, located along the Mobile River in Bucks, Alabama. The carbon dioxide gas is separated and diverted from the plant's flue

gas stream. The capture equipment uses a process developed by Mitsubishi Heavy Industries to produce highly pure carbon dioxide (more than 99.90% carbon dioxide). The capture plant went into operation in early June 2011 and has captured over 210,000 tons of carbon dioxide from the slip stream to date. The Plant Barry capture project is providing supercritical carbon dioxide for the large volume geologic sequestration demonstration project being conducted by the United States Department of Energy's Southeastern Regional Carbon Sequestration Partnership (SECARB). This SECARB project included drilling one site-characterization well, one injection well and one observation well into saline reservoirs in the Citronelle Field. Although oil is produced from other reservoirs within the Citronelle Field, none of the wells for this project was completed into a formation from which oil is produced, and none of the SECARB project wells was involved in the production of oil or gas. The project also involved constructing a twelve mile pipeline to connect the capture plant at Plant Barry to the injection well in the Citronelle Field. The pipeline was completed in late November 2011, passed all integrity testing, and began operation in August 2012.

8. The injection permit for the injection well to which Plant Barry sends its captured carbon dioxide for injection in the SECARB project in the Citronelle Field is an underground injection control (UIC) program Class V permit that was issued by the Alabama Department of Environmental Management in early August

2012. Injection operations began on August 20, 2012. To date, the project has geologically sequestered more than 112,000 tons of carbon dioxide.

9. My responsibilities for the Plant Barry capture project have been to serve as SCS's technical consultant and as its subject matter expert on the transportation and storage aspects of the project. I also have served as the professional geologist of record on the UIC injection permit.

10. A SECARB Saline Reservoir Field Test was conducted by SCS in partnership with a number of other organizations at Mississippi Power Company's Plant Daniel, a power generation facility capable of delivering over 1,000 megawatts of coal-fired electricity into the Jackson County, Mississippi, power grid. Situated near the town of Escatawpa, the facility's site covers about 1,600 acres of surface area in southeast Mississippi. One injection well and one observation well have been drilled to depths exceeding 9,500 feet. The wells provided access to the Massive Sand Unit of the Lower Tuscaloosa Formation for a carbon dioxide GS pilot injection study. A UIC Class V permit was issued by the Mississippi Department of Environmental Quality (MDEQ) for the injection well. Through this Class V well, approximately 3,020 tons of carbon dioxide were injected into the Lower Tuscaloosa Massive Sand Unit in October of 2008.

11. My responsibilities for the Plant Daniel project included being the professional geologist of record for the UIC permit and service as technical consultant and Southern Company oversight for all onsite injection activities.

12. In cooperation with the U.S. Department of Energy (DOE), Southern Company created the National Carbon Capture Center (NCCC) at the Power Systems Development Facility (PSDF), which is located in Wilsonville, Alabama and operated by SCS. The NCCC project is developing technologies under realistic conditions that will reduce the cost of advanced coal-fueled power plants with carbon dioxide capture. This technology development includes the design, procurement, construction, installation, and operation of a flexible facility for the testing of processes for pre-combustion carbon dioxide capture, post-combustion carbon dioxide capture and oxy-combustion. The NCCC can test and evaluate carbon dioxide control technologies including carbon dioxide capture solvents, mass-transfer devices, low cost water-gas shift reactors, scaled-up membrane technologies, and improved means of carbon dioxide compression.

13. Mississippi Power Company is building the Kemper County energy facility that will use state-of-the-art electric power plant technology called integrated gasification combined cycle (IGCC). IGCC converts lignite to gas. The process sends lignite through a device called a "gasifier" that applies high

temperatures and high pressure to chemically convert the lignite into a synthesis gas. The synthesis gas is clean and usable to generate power by firing it in a gas turbine. This innovative technology that will be implemented at the Kemper County energy facility was designed by SCS and partners KBR and the U.S. Department of Energy, and tested at the SCS-operated NCCC. There are three byproducts of the lignite gasification process: carbon dioxide, ammonia and hydrogen sulfide, each of which is captured and removed from the gas stream. The project will capture at least sixty-five percent (65%) of the carbon dioxide gas byproduct. The captured carbon dioxide will be transported as supercritical carbon dioxide along a sixty-one mile pipeline to two unaffiliated companies that will use the supercritical carbon dioxide in productive commercial use for enhanced oil recovery (EOR). EOR permits the extraction of oil deposits that could not previously be economically recovered. Using captured carbon dioxide gas from Kemper for EOR is projected to increase U.S. oil output by two million barrels per year.

14. Supercritical carbon dioxide captured at the Kemper County energy facility also will be transported by pipeline for other commercial uses.

15. SCS, on behalf of the Operating Companies, also has participated in the organization and creation of the Carbon Sequestration Council (CSC). It is my

understanding that CSC is an unincorporated membership association created in 2008. SCS is an originating member of CSC. I serve as SCS's member representative and have been actively engaged with the activities of CSC.

16. CSC submitted comments on EPA's proposed rule entitled "Hazardous Waste Management System: Identification and Listing of Hazardous Waste: Carbon Dioxide (CO_2) Streams in Geologic Sequestration Activities," published in the Federal Register on August 8, 2011, at pages 48073 through 48093. CSC's comments were dated October 7, 2011 and are attached as Exhibit 1 to this Declaration.

17. SCS also submitted comments on EPA's proposed rule and supported CSC's comments (incorporating same by reference). The SCS comments are attached as Exhibit 2 to this Declaration.

18. Under the final rule, it will be necessary for anyone who captures carbon dioxide streams from an emission source to determine whether the captured carbon dioxide stream is a "hazardous waste" subject to RCRA. In conducting its economic assessment for the proposed rule, EPA assumed "[f]or all generators that capture CO_2" that "each facility would incur costs to determine if the CO_2 stream is a RCRA hazardous waste" (76 Fed. Reg. at 48089). As an operator of facilities that

capture carbon dioxide, SCS will incur such costs as a consequence of EPA's promulgation of this final rule.

19. As referenced above, the carbon dioxide to be captured at the Kemper County energy facility will be delivered to a pipeline where it will be used for EOR and also commingled with carbon dioxide from other sources and can be delivered to a variety of different recipients. In its comments, CSC noted that "the supplier of the CO_2 is not likely to have much control over whether any particular CO_2 stream or portion thereof is directed to Class II wells or Class VI wells or divided between them." EPA responded to this comment, stating in part: "EPA acknowledges that under the commenter's hypothetical scenarios, in particular where CO_2 streams for which the conditional exclusion is being claimed are put into a CO_2 pipeline that has the potential to deliver to both UIC Class II and UIC Class VI wells (a scenario that EPA notes does not exist at this time), a generator claiming the conditional exclusion might not be able to confirm with certainty that their CO_2 stream was injected into a UIC Class VI well." Consequently, SCS will be injured by being put in a position of not being able to comply with the certification requirement of the final rule if it decides to contract for the geologic sequestration by a third-party recipient of some of the supercritical carbon dioxide sent from the Kemper County energy facility through the commingled pipeline system to which that supercritical carbon dioxide will be delivered.

20. EPA's final rule requires facilities that capture carbon dioxide streams to be sent for geologic sequestration to determine whether the captured carbon dioxide stream is RCRA hazardous. CSC submitted the following comment:

> It will not be feasible for this determination to be made if a producer of a CO_2 stream cannot apply any of the established tests or criteria for making the determination. For example, existing toxicity criteria are not directly applicable to concentrations that would be present in gaseous emissions. If EPA expects to require producers to make assessments and determinations of toxicity for gaseous emission streams of CO_2, the Agency will need to develop an entire set of toxicity criteria at least for all of the constituents that might be present in CO_2 streams. That might conceivably be done by reassessing each current toxicity criterion for each such constituent, but it would not be appropriate to simply presume that toxicity criteria based on ground water releases from landfills would also be applicable to gaseous emissions.

In response to this comment, EPA stated:

> Response: The Agency recognizes that there are potential questions associated with applying the RCRA definition of hazardous waste to sequestered CO_2 streams. EPA does not apply any significant technical limitations on sampling and analyzing a CO_2 stream, even if it has been compressed to supercritical stage. Generators can conduct analyses to characterize the physical and chemical properties of their CO_2 streams, e.g., whether the CO_2 contains certain impurities, what the concentrations of the impurities are, and whether the CO_2 stream may be corrosive, or apply their knowledge of the hazard characteristic of a waste, in light of the materials or processes used in order to determine whether a waste exhibits a RCRA characteristic.

EPA Response to Comments at 39-40. Consequently, as a result of the final rule, the Operating Companies will be injured by being required to make determinations

as to whether captured carbon dioxide is RCRA hazardous without having specific criteria that can be applied to supercritical carbon dioxide streams.

I declare under penalty of perjury that the foregoing is true and correct.

Date: 08/26/14 _____

Richard A. Esposito

State of Alabama)

Jefferson County)

Subscribed and sworn to before me this 26th day of August 2014,

_____

Notary Public

My commission expires on My Commission Expires February 19, 2017

Exhibit 1 - Comment submitted by Robert F. Van Voorhees, Manager, The Carbon Sequestration Council (CSC) - Document ID: EPA-HQ-RCRA-2010-0695-0084

THE CARBON SEQUESTRATION COUNCIL
1155 F Street, N.W., Suite 700
Washington, DC 20004-1312
202-508-6014

October 7, 2011
Delivered via email

The Honorable Lisa P. Jackson
Administrator
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: Proposed RCRA Conditional Exclusion for Geologic Sequestration
Docket ID No. EPA–HQ–RCRA–2010–0695

Dear Administrator Jackson:

The Carbon Sequestration Council (the CSC) is pleased to submit these comments in response to the notice of proposed rulemaking (NPRM) entitled Hazardous Waste Management System: Identification and Listing of Hazardous Waste: Carbon Dioxide (CO_2) Streams in Geologic Sequestration Activities, 76 Fed. Reg. 48073 (August 8, 2011), Docket ID No. EPA–HQ–RCRA–2010–0695. The CSC is a multi-industry association[1/] formed to provide a forum for inter-industry communication around key issues of carbon capture and sequestration or storage (CCS) including policy, funding, and messaging. CSC facilitates information sharing and consensus building to more effectively promote policies, legislation and regulatory frameworks that foster the use of anthropogenic CO_2 for enhanced oil recovery (EOR) as well as the early use and commercial deployment of geologic sequestration (GS) as a means of addressing greenhouse gas mitigation.

We appreciate the importance of this proposal, as many commenters on the proposed underground injection control (UIC) program rule for GS urged the Environmental Protection Agency (EPA) to provide clarification on the potential applicability to CCS of the Resource Conservation and Recovery Act (RCRA) regulations governing management of hazardous waste. EPA noted in the preamble to the proposal: "In an effort to establish a regulatory framework that supports the future development and deployment of CCS technologies, EPA has set out a goal to provide the regulatory certainty needed to foster industry adoption of CCS." 76 Fed. Reg. at 48077. As we will explain here and in our attached detailed comments, there are better ways to provide the

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1/ Members of the Carbon Sequestration Council are American Electric Power, BHP Billiton, BP Alternative Energy North America Inc., ConocoPhillips, Denbury Resources Inc., Duke Energy, LG&E and KU Energy LLC, Occidental Petroleum Corporation, Shell Exploration and Production, and Southern Company.

regulatory certainty needed. The proposed conditional exclusion will not provide the necessary certainty because, in the form proposed, it will create additional unnecessary uncertainties.

The best way to provide the necessary certainty is to conclude—as we believe EPA must—that captured gaseous carbon dioxide emissions are not solid waste and are, therefore, outside of RCRA's statutory purview under section 1004(27) because supercritical carbon dioxide is not "contained gaseous material"; it constitutes uncontained gaseous material and cannot be solid waste under both the statute and current EPA policy. 42 USC §6903(27) (2010). As explained in our attached detailed comments, EPA has already concluded that air emissions captured by an emissions control device fall outside the jurisdiction of RCRA, especially when that gaseous material is a gas at standard temperature and pressure. Since 1982 EPA has consistently adhered to the policy that "***our authority to identify or list a waste as hazardous under RCRA is limited to containerized or condensed gases (i.e., section 1004(27) of RCRA excludes all other gases from the definition of solid wastes and thus cannot be considered hazardous wastes***)." 54 Fed. Reg. 50968, 50973 (December 11, 1989).

The carbon capture devices currently available and under development operate in a similar manner to capture a gaseous emission stream as air pollution control equipment. Accordingly, captured carbon dioxide streams could not be considered "discarded material". The status of captured carbon dioxide streams was verified in the preamble to EPA's final GS UIC rule, where EPA explained: "carbon dioxide is first captured from fossil-fueled power plants or other **emission sources**." 75 Fed. Reg. 77230, 77233 (December 10, 2010) (emphasis added). As captured air emissions,[2/] these carbon dioxide streams are uncontained gases and were statutorily excluded from RCRA by Congress.

Even if these captured carbon dioxide streams were not gaseous, the carbon dioxide is a commodity that has so many beneficial uses that it would be difficult to consider it to be discarded in any traditional sense because the carbon dioxide stored underground would be available for use in enhanced oil recovery (EOR), in support of geothermal operations and for numerous other beneficial activities. Indeed, captured carbon dioxide streams from some sources could even be used for food grade carbonation with little or no further purification.

[2/] See 76 Fed. Reg. at 48082: "While it is not clear what would be the procedure during maintenance or upset circumstances (such as if the capture process could not function), EPA assumes that the source emissions would be diverted for release under the facility's Clean Air Act permit."

Consistent with these considerations, if EPA were to proceed with promulgation of a regulatory exclusion from RCRA (notwithstanding the congressional exclusion already in the statute), it should be an exclusion from the definition of solid waste rather than an exclusion from the definition of hazardous waste. As noted in the preamble, "EPA has little information about whether carbon dioxide streams would exhibit a RCRA hazardous waste characteristic (in particular, the TC)." 76 Fed. Reg. at 48083. Given the current status of the development of carbon capture technologies and the lack of knowledge about the specific characteristics of captured carbon dioxide emission streams, EPA is not in the position to develop the full range of RCRA criteria and requirements that would be necessary to regulate these streams as potentially hazardous wastes particularly because such streams are quintessentially different from anything else currently managed under RCRA as hazardous waste.

Moreover, any exclusion that EPA fashions needs to address carbon dioxide streams for the full range of scenarios under which the uses of captured anthropogenic carbon dioxide streams are likely to occur. In the proposal, EPA presumes a scenario where, "beginning with the capture and compression of the CO2 stream from fossil-fuel power plants or other industrial sources, after which the CO2 stream is transported (usually in pipelines) to an on-site or off-site location, where it is then injected underground for purposes of sequestration". 76 Fed. Reg. at 48076. But it is not appropriate to presume such a limited single source to single injector scenario. Because geologic sequestration without EOR is still very much in the experimental stage, it is not useful to simply consider current demonstration project scenarios. Instead, it is likely that each of the following scenarios would occur once the technology is implemented on more than an experimental developmental scale:

- Capture of a carbon dioxide stream at a single emission source followed by transport via pipeline to an injection well or wells onsite or offsite through a dedicated pipeline.[3/]

- Capture of carbon dioxide streams at multiple emission sources followed by delivery to a commercial interstate pipeline network[4/] for transport to multiple recipients, some of which will be using the carbon dioxide for enhanced recovery

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3/ 76 Fed. Reg. at 48076 ("[T]he majority of CO2 is expected to be delivered to the sequestration site by dedicated pipeline".)

4/ 76 Fed. Reg. at 48082 ("[M]oving the enormous quantities of CO2 implied by a widespread implementation of CCS technologies would likely require a dedicated interstate pipeline network".), citing CRS Report for Congress. Carbon Dioxide (CO2) Pipelines for Carbon Sequestration: Emerging Policy Issues. Paul W. Parfomak and Peter Folger. January 17, 2008. *Id*., n. 37.

of oil and gas by injecting it through UIC Class II wells, and some of which will be operating UIC Class VI wells for geologic sequestration.

- Capture of carbon dioxide streams at one or more emission sources followed by delivery to a commercial interstate pipeline network where those multiple anthropogenic streams are comingled with naturally sourced carbon dioxide from one or more sources for delivery to multiple recipients, some of which will be using the carbon dioxide for enhanced recovery of oil and gas by injecting it through UIC Class II wells, some of which will be operating UIC Class VI wells for geologic sequestration (and even to other recipients who will be using carbon dioxide for a variety of other activities, including in the production of foods and beverages or for agricultural and other uses).

The scenarios can get more and more complicated, but the point we want to make is that it cannot be assumed that any producer of carbon dioxide through capture of emissions will always be sending that carbon dioxide stream to a single UIC Class VI injection well operation for geologic sequestration. Nor should any regulatory scheme be designed to force that type of singularity upon the nascent industry of carbon dioxide producers. To do so would stifle the potential use of EOR to provide incentives for the production of anthropogenic carbon dioxide streams by saddling both the producers and the operators of EOR projects with new barriers of uncertainty about the potential applicability of RCRA and related or derivative regulatory programs.

Having declared that captured carbon dioxide emission streams are solid waste "when discarded", EPA should not simply dismiss the potential use of such streams by UIC Class II enhanced production well operators.[5/] We know that the use of captured carbon dioxide emission streams as process inputs for enhanced recovery will not be subject to the RCRA solid waste provisions because those materials are not being discarded, but we think EPA will not provide the intended "needed certainty" unless EPA states that the use of carbon dioxide streams for enhanced recovery does not subject those streams to RCRA now or in the future.

To understand the importance of providing this certainty, it is only necessary to consider the following potential scenarios:

- As noted, it is likely that once CCS becomes commercial, dedicated carbon dioxide interstate and intrastate commercial pipeline networks will accept carbon

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5/ 76 Fed. Reg. at 48078, n. 16: "The proposed rule is not intended to affect the status of CO2 that is injected into wells other than UIC Class VI wells. For example, CO2 that is used for enhanced oil or gas recovery (EOR/EGR) in other than UIC Class VI wells, where some sequestration may occur in the process of recovering gas or oil, is beyond the scope of this proposal."

dioxide from both natural and anthropogenic sources for delivery to UIC Class II enhanced recovery operations.

- Some of these EOR operations will have begun years or decades before by receiving only naturally sources carbon dioxide streams and then will receive anthropogenic or mixed source streams.

- Other EOR projects will have already received anthropogenic carbon dioxide either alone or in combination with natural carbon dioxide.

- Some EOR operations can be expected to also operated co-located UIC Class VI wells for GS so that the project can receive constant streams of carbon dioxide from anthropogenic sources regardless of the quantities needed at any particular time exclusively for the EOR operations; any excess carbon dioxide received would be injected into the Class VI wells for GS.

- Some EOR operations may eventually transition to UIC Class VI GS operations under the UIC program and continue to operate inject carbon dioxide streams for GS.

- Some EOR operations may continue to operate as UIC Class II EOR projects and account for the mass of carbon dioxide sequestered in accordance with the provisions of 40 CFR Part 95, subpart RR.

- Still other EOR operations may cease operations as UIC Class II EOR projects while leaving in producing reservoirs substantial quantities of carbon dioxide (originally received from various natural and anthropogenic sources and then recycled through the EOR process for many years).

If EPA declares that captured gaseous carbon dioxide emission streams can be solid waste, then providing the necessary certainty will require a verification of the RCRA status of carbon dioxide streams under the full range of scenarios described in the preceding discussions. The producer who captures carbon dioxide emissions and compresses and then ships those supercritical carbon dioxide streams through pipelines in which those streams will be commingled with other streams before being delivered to the recipient(s) with whom that producer has contracts—and that producer's investors, financiers, insurers, and other financial assurance providers—will need to know with certainty the circumstances, if any, under which those operations might be subject to RCRA solid and/or hazardous waste requirements.

As we have noted, the best and—considering that Congress chose not to bring uncontained gases within the definition of solid waste—the only permissible approach would be to confirm that captured gaseous carbon dioxide emission streams are not solid waste. Failing that, EPA needs to consider and explain how its final action will affect the use of carbon dioxide streams under all of the likely scenarios described above. This could conceivably be done by confirming that the use of carbon dioxide streams for EOR and similar activities has not ever been subject to RCRA and then crafting an exclusion that fully addresses the circumstances under which carbon dioxide streams are managed and injected for GS.

As explained in our detailed comments and as reflected in the scenarios described above, EPA's proposed certification approach is unworkable because the producer of carbon dioxide streams will not always be able to state that its captured gaseous carbon dioxide emission streams are going exclusively to UIC Class VI wells. Instead, it should be sufficient for the producer to determine that the recipients with which the producer has contracted to take the carbon dioxide streams hold UIC permits for the underground injection of carbon dioxide. Under EPA's newly promulgated regulatory scheme, those UIC permits could be issued under Class I, Class II, Class V or Class VI. The assurances that EPA discusses in the preamble as being provided by the UIC Class VI program are provided as well by the other portions of the UIC program. In promulgating the final Class VI rule, EPA reviewed the operation of Class II EOR wells in comparison with Class VI wells and provided for the application of appropriate requirements, including requirements that govern the transition of Class II wells to Class VI wells as and when appropriate. EPA also considered and provided for the circumstances under which carbon dioxide streams could be injected into permitted Class I and Class V wells.[6/] As EPA stated in the preamble to the RCRA proposal, "[p]ursuant to § 1421(d)(2), the UIC program requirements **for all well classes**, promulgated under the authority of the [Safe Drinking Water Act], are designed to comprehensively ensure that an injection well is appropriately sited, operated, tested, monitored, and closed in a manner that ensures USDW protection and does not otherwise adversely affect the health of persons." 76 Fed. Reg. at 48084 (emphasis added). Accordingly, EPA can conclude for all UIC classes "that the elimination of exposure routes through these requirements will ensure protection of human health and the environment" and that RCRA requirements would not "provide any substantial, additional protection for CO2 streams which . . . are disposed in UIC [Class II or] Class VI wells." 76 Fed. Reg. 48085.

6/ 75 Fed. Reg. at 77234 (December 10, 2010): "Today's final rule provides minimum Federal requirements for the injection of CO2 to protect USDWs from endangerment as this key climate mitigation technology is developed and deployed. It clarifies requirements that apply to CO2 injection for GS, provides consistency in requirements across the US, and affords transparency about what requirements apply to owners or operators."

The development of CCS technologies and the completion of experiments to demonstrate the feasibility of GS in saline reservoirs stands at a critical point, and the future of these technologies is clouded by uncertainties—including primarily the lack of economic drivers. Nevertheless, progress can be made by completing the ongoing experiments involving GS in saline reservoirs as well as GS in combination with EOR. In addition, further development will be substantially aided by the incentives and opportunities provided for the anthropogenic production of carbon dioxide streams for EOR operations. Given the other uncertainties that hinder the progress of CCS and GS, EPA should avoid imposing new uncertainties that will undercut the use of anthropogenic carbon dioxide streams for EOR.

We have expressed serious concerns about the final geologic sequestration rules both separately in our comments on the proposed GS UIC and GHG reporting rules and in our comments on the draft guidance documents for the Class VI rule and together with other Multi-Stakeholder Discussion (MSD) participants in our letter to you on May 20, 2011. Nevertheless, if EPA adheres to its enunciated principles and implements the program consistent with its intended design and objectives, we believe that EPA's final GS rules can provide a workable framework for the development and deployment of carbon capture and storage (CCS) as a key mitigation technology for achieving national greenhouse gas reduction goals while prevent endangerment of underground sources of drinking water (USDWs) and thereby protecting human health and the environment.

The Carbon Sequestration Council enthusiastically supports the following statement that EPA presented in the preamble to this RCRA proposal:

> In an effort to establish a regulatory framework that supports the future development and deployment of CCS technologies, EPA has set out a goal to provide the regulatory certainty needed to foster industry adoption of CCS. As mentioned above, EPA believes that GS is a key climate change mitigation technology. Therefore, providing a consistent regulatory approach to GS will promote its future use in the United States.

76 Fed. Reg. at 48077.

This letter and the attached detailed comments present our ideas and recommendations for achieving this objective through the current proposed rulemaking, and we have provided additional comments and recommendations for achieving this important goal through the other "[t]wo important EPA rulemakings that directly address GS activities"—namely the GS UIC rule and the greenhouse gas reporting rule for injection

of carbon dioxide. We have strived and stand ready to work with EPA and the other stakeholders interested in these rules to achieve this announced goal while prevent endangerment of underground sources of drinking water and protecting human health and the environment.

Thank you for the opportunity to comment on the RCRA GS proposal. If you have any questions or need any additional information about these comments, please contact me at bobvanvoorhees@carbonsequestrationcouncil.org or at 202-508-6014.

Respectfully submitted,

Robert F. Van Voorhees, Manager
Carbon Sequestration Council
bobvanvoorhees@carbonsequestrationcouncil.org

cc: Mathy Stanislaus, Assistant Administrator for Solid Waste and Emergency Response (OSWER) -
Suzanne Rudzinski, Director, Office of Resource Conservation and Recovery
Ross Elliott, Acting Assoc. Director, Materials Recovery and Waste Management Division
Nancy Stoner, Assistant Administrator for Water
Cynthia Dougherty, Director, Office of Ground Water and Drinking Water
Ann Codrington, Acting Director, Drinking Water Protection Division

Exhibit 2 - Comment submitted by Chris M. Hobson, Chief Environmental Officer, Senior Vice President, Research & Environmental Affairs, Southern Company - Document ID: EPA-HQ-RCRA-2010-0695-0061

600 North 18th Street
Birmingham, AL 35203

October 6, 2011

RCRA Docket
U.S. Environmental Protection Agency
Mail Code 28221T
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Re: Docket No. EPA-HQ-RCRA-2010-0695

Dear Sir or Madam:

Southern Company ("Southern" or "The Company") appreciates the opportunity to provide comments on the U.S. Environmental Protection Agency's ("EPA") proposed rule to conditionally exclude geologically sequestered carbon dioxide ("CO_2") from regulation under the Resource Conservation and Recovery Act's ("RCRA") hazardous waste program.

As one of the largest generators of electricity in the nation, Southern serves both regulated and competitive markets across the southeastern U.S. Southern participates in all phases of the electric utility business with more than 42,000 megawatts of electric generating capacity and more than 27,000 miles of transmission lines. The Company provides electric service to over 4.4 million retail customers through its subsidiaries Alabama Power, Georgia Power, Gulf Power, and Mississippi Power. In addition, Southern Power, Southern's competitive wholesale generation business, is among the largest wholesale energy providers in the Southeast, meeting the electricity needs of municipalities, electric cooperatives, and investor-owned utilities.

Carbon capture and storage ("CCS") is critical to the mitigation of greenhouse gases and Southern is working to help bring this important technology towards commercial viability. Southern manages the Department of Energy's (DOE) National Carbon Capture Center in Alabama, testing the next generation of technologies to capture carbon dioxide emissions. Also, Mississippi Power's Plant Daniel was the host site for a DOE carbon sequestration demonstration project where 3,000 tons of CO_2 were injected and are being monitored. Beginning this year, Alabama Power's Plant Barry will capture up to 150,000 tons of CO_2 per year for underground storage, and Southern Company is constructing a commercial-scale 582 MW integrated gasification combined cycle plant in Kemper County, Mississippi, with 65 percent CCS.

Southern herby endorses and incorporates by reference the comments submitted to this docket on this proposed rule by the Utility Solid Waste Activities Group, the Edison Electric Institute, the Carbon Sequestration Council, and the CCS Alliance. In sum:

1. While the conditional exclusion from hazardous waste regulation is helpful, EPA has not yet met the burden of explaining why a CO_2 stream should be considered a solid waste. EPA

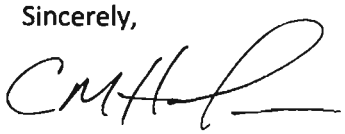
has not explained how geologically sequestered CO_2 qualifies as a discarded material that would result in it being considered a waste, nor has it explained why geologically sequestered CO_2 should be considered a contained gas under RCRA's definition of solid waste.

2. Assuming geologically sequestered CO_2 is a solid waste, the conditional exclusion should clarify that the exclusion will not be lost for minor administrative-type violations that do not bear on the safety of the sequestration facility.

3. The certification statement required under the exclusion should be limited to matters properly within the control and knowledge of the party making the statement. Generators are not in a position to certify the behavior of the facility operator or other generators that send CO_2 to the facility.

Southern supports a single regulatory structure for geologic sequestration of CO_2 as opposed to a structure composed of multiple regulatory laws with overlapping enforcement regimes and penalty provisions. The Company believes that the current RCRA proposal to conditionally exclude CO_2 streams captured and injected for geologic storage from RCRA's stringent hazardous waste controls is an important step in shaping practicable and effective CCS regulations. However, there are several issues that need to be addressed, and Southern Company requests that EPA take the recommendations summarized above, which are discussed in more detail in the groups' comments listed above.

Sincerely,



Chris M. Hobson
Chief Environmental Officer
Senior Vice President
Research & Environmental Affairs

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

CARBON SEQUESTRATION COUNCIL, *et al.*	)	
Petitioners,	)	
v.	)	No. 14-1046 (consolidated with No. 14-1048)
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *et al.*,	)	
Respondents.	)	

DECLARATION OF GREG HARDIN

I, Greg Hardin, declare the following:

1. I am employed by Occidental Oil and Gas Corporation ("Occidental") in the capacity of Director of Regulatory. In that capacity I am responsible for Occidental's environmental or regulatory compliance with federal laws applicable to carbon dioxide ("CO_2") Enhanced Oil Recovery ("EOR"). I have personal knowledge of the matters stated herein.

2. I have worked on environmental and regulatory affairs for at least 20 years and I hold a BS in Mineral Engineering from the University of Alabama. My work experience includes the review, interpretation and application of the Resources Conservation and Recovery Act ("RCRA") to upstream oil and gas operations, including the injection of CO2 for EOR purposes. I am familiar with

the regulation at issue in this case, in which the Environmental Protection Agency exempts "carbon dioxide streams" injected into UIC Class VI wells from hazardous waste regulation under the RCRA, but insists that such streams are "solid wastes" under RCRA. 79 Fed. Reg. 350 (2014).

3. A significant part of Occidental's business is the production of oil and natural gas in the United States and around the world. In appropriate cases, Occidental employs EOR processes, including CO_2 flooding to extend the economic life of producing fields.

4. In CO_2 flooding, which is also called CO_2 enhanced oil recovery or "CO_2 EOR," injected CO_2 releases trapped oil from porous rock in the reservoir and makes the oil flow more easily to the wellhead. During this process, a mixture of oil, natural gas, and a portion of the injected CO_2 flows into nearby wells and is produced to the surface. The CO_2 is then recovered from this production stream and re-injected in a "closed loop" process that results in additional oil recovery. Over time, virtually all of the injected CO_2 becomes permanently trapped underground, occupying the pore space remaining after the oil and gas have been produced. Under the regulation at issue in this case, EPA could consider this trapped CO_2 to be sequestered and, consequently, a solid waste.

5. In the Permian Basin of West Texas and southeast New Mexico, some 60 percent of Occidental's oil production is from fields that actively employ CO_2

EOR technology. Occidental handles approximately 1.8 billion cubic feet of CO_2 per day in the Permian Basin, or approximately 0.7 trillion cubic feet per year. This makes Occidental one of the largest handlers of CO_2 in the world.

6. The expansion of Occidental's EOR operations as new manmade sources of CO_2 become available has the potential to substantially reduce greenhouse gas emissions – by capturing and using the CO_2 in EOR instead of releasing it into the atmosphere. Currently, the majority of fresh CO_2 that Occidental uses is produced from natural underground CO_2 reservoirs. However, the company is actively evaluating projects that will capture CO_2 emissions for use in its EOR operations.

7. Because virtually all of the injected carbon dioxide ultimately is trapped safely, deep in underground formations, Occidental's CO_2 EOR operations are providing information and experience that will help foster full-scale commercial deployment of other carbon capture, storage and sequestration technologies.

8. I am aware that in the preamble to the final rule at issue in this case, EPA said that the status of CO_2 streams injected into wells other than Class VI wells were beyond the scope of the rule, and that "should CO_2 be used for its intended purpose as it is injected into UIC Class II wells for the purpose of EOR/EGR, it is EPA's expectation that such an injection process would not

generally be a waste management activity." 79 Fed. Reg. 355. However, Occidental is concerned about the effects of EPA's broad assertion that "CO_2 streams sequestered for purposes of geological sequestration are 'other discarded material' from industrial and commercial operations and, therefore, are of a similar kind to the other types of wastes specifically referenced by the RCRA statutory definition [and] are, therefore, RCRA statutory solid wastes" and how that assertion may be applied to Occidental's current and future operations. *Id.* It is likely that EPA's assertion of authority, if left undisturbed, will influence Occidental's business decisions concerning the expansion of CO_2 EOR going forward.

9. For example, Occidental will have to carefully consider at what point in a given field, if any, its prospective use of large volumes of CO_2 captured from emission sources, much of which eventually would remain trapped underground, will cause EPA (or non-governmental organizations) to claim that Occidental is sequestering CO_2 and managing "solid waste," potentially subject to regulation as hazardous waste. In other words, EPA's assertion of RCRA authority over captured CO_2 that is sequestered will necessarily influence Occidental's decisions concerning the extent to which it will use captured CO_2 in our EOR operations. If EPA's assertion of authority were overruled, then Occidental's business decisions

in this regard could be made unburdened by the potential for RCRA regulation and liabilities.

10. Should EPA or (or non-governmental organizations) claim that Occidental is sequestering CO_2 and managing "solid waste," Occidental may be required, at a significant cost, to provide financial assurances for the long term management of risks commensurate with those associated with hazardous waste disposal.

11. Should EPA or (or non-governmental organizations) claim that Occidental is sequestering CO_2 and managing "solid waste," EPA may further claim that emissions associated with oil and gas operations are subject to the only overlap between RCRA and the Clean Air Act: regulation of emissions of hazardous air pollutants from "hazardous waste treatment, storage, and disposal facilities." *See* CENTER FOR COMMUNITY ACTION AND ENVIRONMENTAL JUSTICE v. BNSF RAILWAY COMPANY, No. 12–56086 (9^{TH} Cir. August 20, 2014).

12. Occidental is currently a member of the American Petroleum Institute ("API") and was a member as of the date that API's petition for review was filed (April 3, 2014).

I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 28, 2014.

Greg Hardin

CERTIFICATE OF SERVICE

I hereby certify that on August 28, 2014, the foregoing Opening Brief Of Petitioners Carbon Sequestration Council, Southern Company Services, Inc., and American Petroleum Institute (Initial Brief) was served electronically through the Court's CM/ECF system on all registered counsel.

DATED: August 28, 2014 /s/Thomas Sayre Llewellyn